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TWENTY-FOURTH ANNUAL REPORT

OF THE

...ILLINOIS...

STATE DAIRYMEN'S
ASSOCIATION,

HELD AT

RED BUD, ILLINOIS,

JANUARY 11, 12 AND 13, 1898.

COMPILED BY

J. H. MONRAD, Secretary.

Stenographic Report by Mrs. R. Howard Kelly.

ELGIN, ILLINOIS:
NEWS-ADVOCATE PRINTING AND BINDING HOUSE,
1898.

LETTER OF TRANSMITTAL.

OFFICE OF SECRETARY,
ILLINOIS STATE DAIRYMEN'S ASSOCIATION,
WINNETKA, ILL., 1898.

To His Excellency J. R. Tanner, Governor of the State of Illinois :

I have the honor to submit the official report of the Illinois State Dairymen's Association, containing the papers, addresses and discussions at its twenty-fourth annual meeting, held at Red Bud, Illinois, January 11-13, 1898.

Respectfully,

J. H. MONRAD.

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LIST OF OFFICERS 1898.

President—

GEO. H. GURLER, DeKalb.

Vice President—

JOS. NEWMAN, Elgin.

Directors—

JOHN STEWART, Elburn.

S. G. SOVERHILL, Tiskilwa.

R. R. MURPHY, Garden Plain.

GEO. H. GURLER, DeKalb.

A. G. JUDD, Dixon.

JOS. NEWMAN, Elgin.

R. G. WELFORD, Red Bud.

Treasurer—

JOS. NEWMAN, Elgin.

Secretary—

J. H. MONRAD, Winnetka, Ill.

18 May 44 U. of J. "Murphy"
V. 24, 38; 1898, 1912 cont. En

List of Members Having Paid Their Dues for 1898.

A

<p>Ardrey, R. G., Oakdale, Ill. Alexander, C. B., No. 4 Sherman St., Chicago, Ill.</p>	<p>Anderson, John, Ames, Monroe Co., Ill. Aunefeld, Earnest, Red Bud, Ill.</p>
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B

<p>Bloomfield, R. A., Box 97, Mt. Sterling, Brown Co., Ill. Bloyer, Geo., Harper, Ogle Co., Ill. Baetje, Herman J., Smithton, St. Clair Co., Ill. Baldwin, Geo. H., Mendon, Adams Co., Ill. Buettner, Julius, Red Bud, Ill. Biddulph, J. R., Providence, Bureau Co., Ill. Bloyer, Otho, Elkhorn Grove, Carroll Co., Ill. Bagley, F. R., 225 Dearborn St., Chicago, Ill. Bote, Wm. Richmond, Ill. Burton, G. F., Mt. Carroll, (Box 77), Ill. Benze, Fred, Red Bud, Randolph Co., Ill. Benson, A., Oregon, Ill. Boyd, John, Chicago, Ill.</p>	<p>Blakeway, Mrs. H., Ridott, Stephenson Co., Ill. Bryant, E. R., 629 Main St., Terre Haute, Ind. Roeseburg, Geo., Lanark, Ill. Buehler, Anton, Bemes, Will Co., Ill. Boyle, S. T., Baldwin, Randolph Co., Ill. Baltz, Leonhardt, Millstadt, St. Clair Co., Ill. Bingham, A. M., Jessup, Ia. Broughton, W. J., 138 Jackson St., Chicago, Ill. Beaiard, C. F., Sparta, Ill. Beckman, H. C., Cor. Canal and Randolph Sts., Chicago, Ill. Bailey, O. J., Peoria, Ill. Baltz, F. L., Millstadt, St. Clair Co., Ill.</p>
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C

<p>Crow, B. F., Cairo, Alexander Co., Ill. Challacomb, N. B., Challacombe, Macoupin Co., Ill. Conner, Wm. H., Prairie de Rocher, Randolph Co., Ill. Cooley, J. H., Hillsdale, Rock Island Co., Ill.</p>	<p>Cheeseman, James, 2112 Michigan Boulevard, Chicago, Ill. Christ, John, Washington, Paswell Co., Ill. Carbaugh, W., Lanark, Ill. Clarke, F. D., Fair Haven, Ill. Carpenter, K. B., Thompson, Ill. Cutler, Geo. A., Belvidere, Ill.</p>
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D

<p>Davis, D. K., Fairfield, Wayne Co., Ill. Dietz, E. J. W., cor. Adams St. and Fifth Ave., Chicago, Ill.</p>	<p>Duell, H. R., Franks, Ill. Dorsey, Lee S., Moro, Madison Co., Ill.</p>
--	--

E

<p>Erfert, F. J., No. 22 Fifth Ave., Chicago, Ill.</p>	<p>Eastman, H., Steward, Ill.</p>
--	-----------------------------------

F

Fisher, Wm. A., Shipman, Ill. Fraser, Wilber J., Champaign, Ill.
 Flood, S. D., 229 S. Water St., Chicago, Ill. Fleming, Wm. W., Alden, Ill.

G

Gurler, Geo. H., DeKalb, Ill. Gilbert, Christian, Red Bud, Ill.
 Gemmill, C. E., Cutler, Ill.

H

Hostetter, W. R., Mt. Carroll, Carroll Co Ill. Huckley, John, St. Jacob Cry. Co., St. Jacob, Ill.
 Hoppensteadt, Geo. W., Eagle Lake, Ill. Hanna, J. F., Murphysboro, Jackson Co., Ill.
 Harvey, L. P., Clare, DeKalb Co., Ill. Hamilton, A. P., Murphysboro, Jackson Co., Ill.
 Hofsonmer, Wm. J., Breeze, Ill. Horton, H. M., Ravenswood, Ill.
 Hecke, Henry, Red Bud, Randolph Co., Ill. Howell, J. P., Creston, Union Co., Ill.
 Harvey, Heber, Esmond, DeKalb Co., Ill.
 Hopkins, H. H., Hinkley, Ill.
 Hank, Riley B., 2 Market St., St. Louis, Mo.

J

Jennings, A. A., No. 4 Sherman St., Chicago, Ill. Judd, A. G., Dixon, Ill.
 Jordon, T. F., Savoy, Ill.

K

Kirkpatrick, J. R., Oakdale, Washington Co., Ill. Kolmer, Louis, Waterloo, Monroe Co., Ill.

L

Littlefield, G. L., Savanna, Ill. Larson, F., De Laval Separator Co., Chicago, Ill.
 Liefer, Lewis, Red Bud, Randolph Co., Ill.
 Lewis, M. M., Victor, Ill.

M

Meyers, August, Red Bud, Ill. Murphy, F. M., Garden Plain, Ill.
 Magill, H. V., Auburn, Sangamon Co., Ill. Miller, Chas. F., Sparta, Ill.
 Mann, W. E., Kaneville, Kane Co., Ill. Munier, John, O'Fallon, Ill.
 Monrad, J. H., Winnetka, Cook Co., Ill. McDill, J. T., Sparta, Ill.
 McDonald, A. S., Trivoli, Peoria Co., Ill. Meyer, Nie, New Memphis, Ill.
 Merritt, S. S., Henry, Marshall Co., Ill. Monteith, S. L., Campbellville, Jackson Co., Ill.
 Moor, C. F., St. Clair, Mich. Metzger, F. L., Millstadt, Ill.
 Mallory, Grant, Freeport, Ill.

N

Nagel, Henry, Prairie, Randolph Co., Ill. Newman, Jos., Elgin, Ill.
 Nelson, Peter, Creston, Ill. Nolting, A., Elgin, Ill.
 Newman, John, Elgin, Ill.

P

Phillips, Louis, Germantown, Ill.
 Peak, S. W., Winchester, Scott Co., Ill.
 Patton, R. A., Hanna City, Ill.
 Pethebridge, R. H., Union Dairy Co., St.
 Louis, Mo.

Pearson, R. A., U. S. Department of Agri-
 culture, Washington, D. C.
 Putman, C. W. Aurora, Ill.

R

Richey, F. P., Victor, DeKalb Co., Ill.
 Rotermund, H. F., Bemis, Will Co., Ill.

Redpath, R. C., Houston, Randolph Co., Ill.
 Reed, Geo., Herbert, Ill.

S

Spoenemann, August, Oakdale, Washing-
 ton Co., Ill.
 Savage, H. G., Warrenville, DuPage Co.,
 Ill.
 Schlueter, Herman, Germantown, Ill.
 Shumann, J. H., Bartelso, Clinton Co., Ill.
 Smidt, Clementis, Red Bud, Ill.
 Stocking, Milo A., Trivoli, Peoria Co., Ill.
 Sauer, Mrs. Dora, Red Bud, Ill.
 Sudendorf, Ed., Elgin, Ill.
 Segar, J. W., Pecatonica, Ill.
 Schriber, Lewis, Red Bud, Randolph Co.,
 Ill.
 Schultz, O., Waterloo, Monroe Co., Ill.
 Smith, C. W., 5 W. Washington St., Chi-
 cago, Ill.

Spies, L. A., St. Jacob, Madison Co., Ill.
 Soverhill, S. G., Tiskilwa, Ill.
 Stover, W. D., 309 Olive St., St. Louis, Mo.
 Snyder, Sam'l L., Polo, Ill.
 Seeley, J. H., Kendall, Ill.
 Smith, W. H., Box 746, Sandwich Co., Ill.
 Smith, J. P., Freeburg, Ill.
 Spicer, C. W., Edelstein, Ill.
 Spicer, G. G., Edelstein, Ill.
 Senn, Samuel, Jamestown, Clinton Co., Ill.
 Smith, H. L., Cortland, N. Y.
 Stewart, John, Elburn, Ill.
 Stewart, T. B., Elburn, Ill.
 Schlimme, M., Elgin, Ill.
 Simpson, James H., Ruma, Randolph Co.,
 Ill.

T

Taylor, W. H., Stillman Valley, Ill.
 Thompson, A. E., Hebron, McHenry Co.,
 Ill.

Thress, W., Smithon, St. Clair Co., Ill.
 Tripp, F. A., Ogden Building, Chicago, Ill.

W

Welford, R. G., Red Bud, Ill.
 Woodard, Chas. H., Kaneville, Ill.
 Walden, W. E., Stillman Valley, Ill.
 Wildeman, W. H., Freeburgh, Ill.
 Werner, J. H., Naperville, Ill.
 Wait, C. M., Union, McHenry Co., Ill.
 Waterman, Geo. E., Garden Prairie, Ill.

Winter, Albert, Waterman, Ill.
 Walsh, Michael F., Red Bud, Ill.
 White, C. L. Beaucoup, Washington Co.,
 Ill.
 Weihe, C. L., New Minden, Washington
 Co., Ill.
 Wilson, Geo. R., Monmouth, Ill.

Z

Ziebold, Geo. W., Red Bud, Ill.

Ziebold, N. G., Red Bud, Ill.

BY-LAWS OF THE ILLINOIS DAIRYMEN'S ASSOCIATION.

OFFICERS.

Section 1. The officers of this Association shall consist of a President, Vice President, Secretary, Treasurer, and Board of Directors, composed of seven members, of whom the President and Vice President of the Association shall be members and the President *ex-officio* Chairman.

DUTIES OF PRESIDENT.

Sec. 2. The President shall preside at the meetings of the Association and of the Board of Directors. It shall be his duty, together with the Secretary and Board of Directors, to arrange a program and order of business for each regular annual meeting of the Association. He shall have power to call special meetings of the Association and of the Board of Directors, and upon the written request of five members of the Association it shall be his duty to call such special meetings. It shall be his further duty to call on the State Auditor of Public Accounts for his warrant on the State Treasurer, for the annual sum appropriated by the Legislature for the use of this Association, present the warrant to the Treasurer for payment, and on receiving the

money receipt for the same, which he shall pay over to the Treasurer of the Association, taking his receipt therefor.

DUTIES OF THE VICE PRESIDENT.

Sec. 3. In the absence of the President his duties shall devolve upon the Vice President.

DUTIES OF THE SECRETARY.

Sec. 4. The Secretary shall record the proceedings of the Association and of the Board of Directors. He shall keep a list of the members, collect all the moneys due the Association (other than the legislative appropriations), and shall record the amount, with the name and postoffice address of the person so paying, in a book to be kept for that purpose. He shall pay over all such moneys to the Treasurer, taking his receipt therefor. It shall also be his duty to assist in making the program for the annual meeting and at the close of the said meeting compile and prepare for publication all papers, essays, discussions, and other matter worthy of publication, at the earliest day possible, and shall perform such other duties pertaining to his office as shall be necessary.

DUTIES OF THE TREASURER.

Sec. 5. The Treasurer shall, before entering on the duties of his office, give a good and sufficient bond to the Directors of the Association, with one or more sureties, to be approved by the Board of Directors, which bond shall be conditioned for a faithful performance of the duties of his office. He shall account to the Association for all moneys received by him by virtue of said office and pay over the same as he shall be directed by the Board of Directors. No money shall be paid out by the Treasurer except upon an order from the Board, signed by the President and countersigned by the Secretary. The books of account of the Treasurer shall at all times be open to the inspection of the members of the Board of Directors, and he shall, at the

expiration of his term of office, make a report to the Association of the condition of its finances, and deliver to his successor the books of account, together with all moneys and other property of the Association in his possession or custody.

DUTIES OF THE BOARD OF DIRECTORS.

Sec. 6. The Board of Directors shall have the general management and control of the property and affairs of the Association, subject to the By-Laws.

Four members of the Board shall constitute a quorum to do business.

The Board of Directors may adopt such rules and regulations as they shall deem advisable for their government, and may appoint such committees as they shall consider desirable.

They shall also make a biennial report to the Governor of the State of the expenditure of the money appropriated to the Association by the Legislature.

It shall be their further duty to decide the location, fix the date and procure the place for holding the annual meeting of the Association, and arrange the program and order of business for the same.

ELECTION OF OFFICERS.

Sec. 7. The President, Vice President and Board of Directors shall be elected annually by ballot at the first annual meeting of the Association.

The Treasurer and Secretary shall be elected by the Board of Directors.

The officers of the Association shall retain their offices until their successors are chosen and qualify.

A plurality vote shall elect.

Vacancies occurring shall be filled by the Board of Directors until the following annual election.

MEMBERSHIP.

Sec. 8. Any person may become a member of this Asso-

ciation by paying to the Treasurer such membership fee as shall from time to time be prescribed by the Board of Directors.

QUORUM.

Sec. 9. Seven members of the Association shall constitute a quorum for the transaction of business, but a less number may adjourn.

ANNUAL ASSESSMENT.

Sec. 10. One month prior to the annual meeting in each year the Board of Directors shall fix the amount, if any, which may be necessary to be paid by each member of the Association as an annual due.

Notice of such action must be sent to each member within ten days thereafter, and no member in default in payment thereof shall be entitled to the privileges of the Association.

AMENDMENT OF BY-LAWS.

Sec. 11. These by-laws may be amended at any annual meeting by a vote of not less than two-thirds of the members present. Notice of the proposed amendment must be given in writing, and at a public meeting of the Association, at least one day before any action can be taken thereon.

PROCEEDINGS

OF THE

TWENTY-FOURTH ANNUAL MEETING

OF THE

ILLINOIS STATE DAIRYMEN'S ASSOCIATION

HELD AT

Red Bud, Illinois, January 11-13, 1898.

[Stenographic Report by Mrs. R. Howard Kelly, Chicago.]

The Illinois State Dairyman's Association met in annual session January 11th, 1898. at 10:30 a. m. o'clock.

President George H. Gurler in the chair.

PRAYER.

BY ELDER C. W. ALEXANDER.

Oh, Lord, our Father in heaven, we are thankful to thee this morning for the light of this day and for all the blessings and privileges that it brings with it. We thank thee for life and health and strength; grant that we may use this strength to do

thy will, for the accomplishment of thy purposes; for the bettering of ourselves in this world and for thy glory. Bless these friends who have come into our midst; may their coming be a blessing unto us and this town, and as they go away from here, may they carry with them something good that we have rendered unto them during their stay with us. May the blessing of the Lord be with us all, those who come and those of us who are left. Guide us, we pray thee in all our deliberations; may the spirit of brotherly love and kindness run through all these meetings and guide our minds and hearts to those things that may tend to better ourselves, and the world, made better because we have lived in it.

Prepare us for all the events of thy providence, forgive us all our sins and at last when thou art done with us here upon earth, receive us into thy upper and better kingdom, we ask, in Jesus' name, Amen.

ADDRESS OF WELCOME.

N. G. ZIEBOLD, MAYOR OF RED BUD.

Mr. Chairman and Members of the Illinois Dairymen's Association:

It is with pleasure that I in behalf of the citizens of Red Bud and the farmers of our vicinity bid you a most hearty welcome. We shall endeavor to the best of our power to make this meeting pleasant as well as instructive. We shall highly appreciate the advantages that we shall derive from the papers and discussions given by the members of this society, and feel that our community will derive great benefit and assistance in their agricultural pursuits. I will not further postpone the exercises that are to come, but I will say that we extend the liberty of our city to the members and hope that when this meeting is over and they leave here, they will carry a long list of names of members from among us. I again bid you a hearty welcome.

RESPONSE.

HON. J. E. MILLER, BELVIDERE.

Mr. President, Ladies and Gentlemen:

In return for the eloquent words of welcome by the mayor of your city in behalf of the people of this county to which we have just so cordially listened, I extend the heartfelt thanks of the Illinois State Dairymen's Association. We accept them as a recognition of the good work of our association in its efforts to develop one of the leading industries of the state. We congratulate the good people of your enterprising city in securing this convention, and we cordially invite them to our meetings, to take part in our discussions and to aid in our work. Let us have a free interchange of opinions, we learn by failure as well as by success. Through our mistakes we learn the truth; we learn by the mistakes of others as well as by our own. As experience is a dear school let us take advantage of the experience of others, and this is a good place to hear of them.

We come not to dispel Egyptian darkness, that is far from our intention, we are here on a friendly and social visit for the purpose of extending the social and business relationship of all interested in our business. We are here to divide with you what we have learned of that business; we are also here for the purpose of increasing our own knowledge, believing that a people that have in so few years successfully established the dairy industry in new and untried fields, and have advanced it from its primitive forms to the most advanced and modern methods, and whose products grade with the best, are a good people to confer with when practical knowledge is desired. We further congratulate you on these things and trust that our efforts will meet with your approval and be deemed worthy of your support. So when we come to part we may feel strengthened and encouraged and may feel glad for having been here.

Our object in our annual pilgrimages throughout the state is to bring together the farmer and creameryman, the merchant and the shipper, and all connected with the business, so that all

may come to a natural and beneficial understanding; to fertilize the intelligence of all connected with the dairy industry by disseminating practical and useful knowledge, and only by united and intelligent efforts can the best results be obtained. The more thought, the more observation, the more intelligence and the more brains that we put into our avocation, and the more we master the principles which underlie every department of the business, the greater will be our chance of successfully prosecuting it. The short and mild winters of southern Illinois, its rich lands and proximity to the great southern markets are items in your favor. You are able to produce well at that season when winter prices prevail; but to then obtain the best results it is necessary to establish as far as possible summer conditions. Warm stables are essential in order to equalize the conditions of a most variable climate, and succulent food to replace summer pastures.

The dairy business is the scientific branch of farming; it improves the farmer as well as the farm, it renovates and restores wasted soil, brings cash returns throughout the entire year. The dairy farmer can raise as much hay and grain and of better quality as he can without his cows, have their increased profits, supplemented by an increase of soil fertility. Wherever we find a dairy section in the state we find thrift and prosperity.

No rivalry or jealousy exists between any of the dairy sections, the success of one does not conflict with the success of another; on the contrary the good reputation of the dairy products of our state in the markets of the world tends to the glory and the benefit of all. The same is true in a reversed condition. Let all interested unite and labor for the advancement of our chosen industry all along the line. Unite for the purpose of securing proper dairy legislation, unite and determine to prevent fraudulent goods from entering the markets sacred to an honest industry, one that can only be permanently successful by adhering to honest methods; to prevent them from entering such markets with the stamp or trademark that only and justly belongs to honest goods.

Our industry has a broad and just claim to protective legisla-

tion, being a source of immense revenue to the people of the state, a preserver of its soil fertility and a most important branch of that great industry that feeds and clothes the nations.

I conclude by once more cordially thanking you for this kind reception.

SECRETARY'S REPORT.

Mr. President and Fellow Members:

Even if our meeting is not as successful as we might have desired, we may console ourselves in having done our duty by coming thus far south. I feel that both the local committee and myself have done all we could in advertising the meeting and that special thanks are due to the energetic efforts of Mr. R. G. Welford.

It was my ambition to have collected some historical facts as to our Association, but find it difficult even to secure the names of the presidents and secretaries. The first meeting was organized in Elgin, December 14 to 16, 1874, with Dr. Joseph Tefft as president and M. H. Thompson as secretary. In 1882 we find Dr. Tefft still president and I presume he remained during the seven intervening years. Mr. R. P. McGlincy was secretary in 1882 and remained as such up to 1887. Mr. H. B. Gurler became president in 1885 and 1886. In 1887 Mr. Lovejoy Johnson became president and Mr. R. Lespinasse secretary, the latter remaining up to 1891, while Mr. Johnson remained to 1894, when Mr. John Stewart became President. Mr. W. R. Hostetter acted as secretary up to 1895, when Mr. E. E. Critchfield acted to 1896, late in the fall, when I took charge.

Meetings were held in

Elgin.....	1874
Champaign.....	1884
Belvidere.....	1885
Aurora.....	1886

Mt. Carroll.....	1887
Changing from December to January, no meeting	1888
Springfield.....	1889
Belvidere.....	1890
Ashley and Dixon.....	1891
Kewaunee.....	1892
Sycamore.....	1893
Dixon.....	1894
Rochelle.....	1895
Princeton.....	1896
DeKalb.....	1897

I shall turn over to my successor at least three copies of 1895, 1896 and 1897, etc., reports, a thing which ought to have been done all along, as we have no reliable records at all.

I would suggest that the Association attempt to buy up a copy of each year's reports before 1895, to be handed over from secretary to secretary, and hope all old members will search their memory and help me.

I have tried to locate the creameries in the various counties and am not through verifying them. It may be of interest to know that if we divide the state in three parts, 34 counties in each, then we find about 106, and two skim stations, in the southern, 26 in the central, and 426 creameries, 6 skim stations and 5 cheese factories in the northern 34 counties. Among the southern counties 14 have no creameries, the central 18 and the northern 4, making in all 36 counties without any creameries running. The 13 most northern counties average 24 creameries to each, McHenry leading with 61, DeKalb 34, Stephenson 28, DuPage 26, Kane 26, Ogle 22.

In the southern Randolph leads with 18, St. Clair 13, Madison 12, Clinton 10.

These figures are not quite correct, but they convince me of one thing and that is, that there is plenty of room for more creameries. Not that I desire to see every farmer make dairying a specialty, but because I am convinced that better work can be done through this system of dairying. There are several counties where there are many farmers milking from 10 to 50 cows, laying most stress on raising calves. In these the farm

separator hand or power will enable the farmers to get the skim milk sweet and to produce a good cream for a gathered creamery. In other localities the system of small skim-stations will be found profitable, where large separator creameries are hardly justified as yet.

Not that I want to do away with, but I hope to see all poor private dairying replaced by the above system.

We have, thanks to the National Dairy Union and its leading workers in the state, Chas. Y. Knight, Geo. Linn, H. B. Gurler, George Reed and many others, secured the anti-color, Oleo law, but unless we can secure a dairy commissioner, with sufficient funds to prosecute, it remains virtually a dead letter. There is at present retailed more colored butterine than ever in Chicago.

The filled cheese manufacture does not seem to increase, and I believe the manufacturers are complying with the law. Its place is taken, to a great extent, by a more or less hard skimmed cheese, where water is made to take the place of fat to a certain extent.

While prices have been low, the average of the year will surely show an improvement and the experiment shipments made by the Dairy Division have confirmed me in the belief that if we make the butter clean-flavored, with a good keeping quality, there is no reason why it should be sold for less than 15 cents at any time. It is better to export at that price than to fill the refrigerators and depress the markets later on. We must not look for high prices, but make up our minds to make better butter and cheaper. This can best be done if the farmers will take the trouble to test the cows and keep a record and take better care of the milk. To encourage this I recommend a monthly perambulating dairy school.

In this connection I regret that an otherwise perfectly honest and meritorious business is being abused and threatens to hurt our creamery butter. I refer to the new process of melting old rancid dairy butter and rechurning it. Some manufacturers quote and sell it honestly as imitation creamery, while others

quote it as *Elgin made* creamery, or something like that. It seems to me that we ought to compel its being branded under its own name.

It is also highly desirable that we secure a larger appropriation, so as to do as Canada, Wisconsin and other states do, send out traveling instructors. We do not get near enough to the very farmers that need our help and encouragement the most. Pending an increased appropriation, I suggest the using of \$200 or \$300 to send speakers to farmers' institutes, and economise more at our annual meeting. While these annual meetings are of incalculable value to the local people, I really feel discouraged that we cannot do more good, cannot infuse more of the true dairy enthusiasm.

The financial statement of the secretary and treasurer was read and referred to the directors and will be found in the back part of the report.

It was moved and seconded that the secretary be authorized to spend the necessary money to collect volumes of reports of the meetings of this association up to date, as far as it is possible, such reports to be kept in the possession of the secretary of the association.

Carried.

The convention took recess till 1:30 o'clock.

The convention met at 1:30 P. M. same day.

The President in the chair.

Piano Solo, Master George Becker.

PRESIDENT'S ANNUAL ADDRESS.

Ladies and gentlemen:—I am proud to be called upon to preside at this the twenty-fourth annual meeting of the Illinois State Dairymen's Association. And in assuming the charge I fully realize the responsibility. The earnest co-operation of the

members is desired and I feel assured will be given to sustain my efforts.

In dairying, as well as in every other occupation, new ideas spring up all along the line; if we keep pace with the times we must consult with those who are leaders in the dairy business; those who are constantly adding to their store of knowledge the lessons learned only by experience.

Nowhere are offered better opportunities to exchange experiences and ideas than at our conventions, where it is the aim to have the best talent the state and nation afford.

I have noticed there are some members taking no part in the discussions, who, when they are questioned privately are full of valuable information; we need this information in the discussions that follow the papers and want it in our annual report that the readers may be benefited. I hope every member here will consider it his or her duty to join the discussions.

From time to time the people have demanded a better quality of butter. Butter churned in a wooden dash churn, under existing conditions, don't satisfy the people of this fast age; they demand a better quality of dairy butter, yes, dairy butter is not good enough for many who have their taste cultivated to that standard that the best creamery is none to good, (the better the quality the greater the consumption).

There is no reason why the quality should not be further improved; there is no state in the Union where the conditions are more favorable for making butter of the highest excellence than in the state of Illinois.

Perhaps the reason that there is not more fine butter made in our creameries might be found, to no small extent, at least, in the want of proper care of the cows and milk on the farm, and in transit of milk to the creamery.

Then, also, many buttermakers are not as particular in receiving milk at creameries and perhaps not as free in giving instructions as to care of milk as they should be.

My observation has been that there is too much of a disposition on the part of many farmers to get their milk through the weigh can with as little care as possible, regardless of conse-

quences; though perhaps it has been fostered by the creamery man in his sacrifice of quality to quantity.

The proportion of good butter is constantly increasing, still there is a large amount of poor butter manufactured, especially in gathered cream factories and dairies. There is no reason why an intelligent dairyman, posted in his business, should not make as fine butter as is produced.

A well posed dairyman of to-day, by the use of the Babcock test, can determine the value of his cows. It is not necessary for him to keep unprofitable ones, he can establish a standard and dispose of those that do not come up to it.

I think the tendency of the farmers to keep records of farm accounts is growing each year; should a man in mercantile business adopt the same methods as many farmers the sheriff would soon be at the door.

We find the general trend of dairying is in rather a different direction than heretofore: our greatest effort, in the past, has been to increase the quantity, and improve the quality of the product and lighten labor incident to production.

The low prices of the last few years have brought to the front the question of cheap production and the shrinkage of profits.

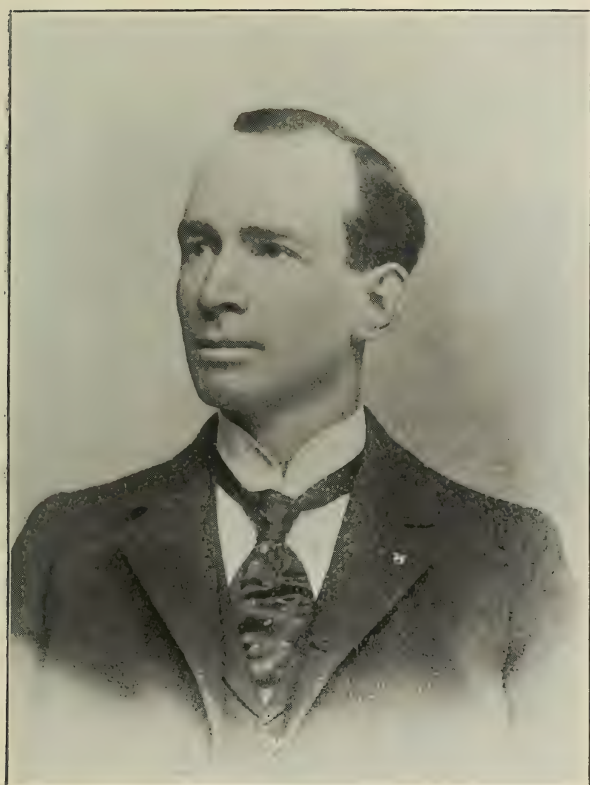
The dairy business represents as large a capital, perhaps, as any industry in Illinois; such a business, engaging such a class of and such numbers of citizens should have the protection its importance demands.

The Legislature has been very liberal in its appropriations for publication of our reports and for expenses incident to the meetings, but we want more.

The national Dairy Union and other associations and individuals have through persistent work secured an "anti-color" law, but a State Dairy Commissioner, with sufficient funds and assistants is needed to enforce the law.

I am sorry to see Illinois so far behind her sister states in dairy education; more interest should be taken in Farmers' Institutes where much good can be accomplished.

The fund appropriated by the state, fifty dollars, will hardly defray the necessary expenses of a good institute in all parts of



PROF. CURTISS.

the state, but I know that DeKalb Co., has held several successful institutes where the expense did not exceed that amount; for this reason I would suggest that our officers be instructed to devote as much as can be spared from our annual appropriations towards sending good speakers to such institutes as may apply for them.

It is to be hoped that the annual appropriations will be increased to enable us to send out regular Dairy Instructors as does Wisconsin.

The steps taken by our Secretary of Agriculture in opening a market in England for our butter, has taught us that we can compete with the world.

□ We have become acquainted with the class of goods demanded, transportation has been furnished at reasonable rates and we are now ready to do business with the foreigner whenever the market on either side of the water warrants it.

Our last year's membership was 219, the largest the association ever had, we hope to exceed that number this year, to show the dairymen in the northern part of the state that the southern part is alive to the dairy interest.

Our worthy secretary has secured large donations to be offered at this meeting as premiums on butter, there are some very valuable medals included in the list, the ones that are fortunate enough to get them will have something to be proud of.

I trust that we will have such a meeting that you can say when you go to your homes that the 24th annual meeting of the Illinois State Dairymen's Association was a success.

THE PROFITABLE DAIRY COW.

PROF. C. F. CURTISS, AMES, IOWA.

Ladies and Gentlemen:

I assure you that it is a pleasure to me to meet with the dairymen of the great state of Illinois on this auspicious occasion.

I was impressed a few years ago in traveling through the south and central parts of Illinois with the abundance of corn and other grain crops that you are producing, and I apprehend that during the past few years you have been confronted with the same conditions that have made those years unprofitable ones to the Iowa farmer. The freight agent of one of our leading lines of railroad told me last spring that they had at that time eighty million bushels of corn cribbed up on their line of road in our state, and not a bushel of that corn could be moved at a profit to the producer or the railroad either. Where we have as productive a soil and as favorable conditions as we have in Iowa and you have in Illinois, the tendency is to overdo the production of grain crops, and I want to urge that you make more use of the dairy cow in marketing these products. I notice that you are producing very largely of wheat, and wheat during the past five or six months has been a profitable crop, but your soil will not always go on producing wheat. Has it ever occurred to you that in sending to market one thousand dollars' worth of wheat at the ordinary price that you are taking from your farm three to four hundred dollars' worth of fertility, or what it would take three to four hundred dollars' worth of commercial fertilizers to replace if you were obliged to pay out money for them. Of course I recognise that you are not obliged to buy commercial fertilizers, but notwithstanding that, your soil will not go on producing wheat indefinitely.

On the other hand, you can produce and send to market one thousand dollars' worth of cheese and take from your farm only eighty-five dollars' worth of material that is of any value as a fertilizer. You can produce and send to market one thousand dollars' worth of butter and not take one dollars' worth of fertility from your farm. These are facts which we need to consider in governing our production. We must remember, too, that though there are times when grain will sell well enough to return a good profit, that is only for a very short period. This immense amount of grain, of which I speak, that was stored in in our state, had a possible market of forty to fifty cents a bushel when fed to good dairy cows or good stock of any kind. There

is no channel through which we can market our crops with such good results as through the good dairy cow.

I have been asked to discuss the profitable dairy cow, and I come to you to-day pleading for the practical dairy cow, the business cow, the cow that does business at a profit. Now, that does not necessarily mean a cow of any particular type or breed, although I am heartily in favor of recognizing and adhering to some good breed. I am a thorough believer in blood, in the potency of good blood and the evil of bad blood. Good cows do not come by chance, nor by haphazard methods, they are the result of skillful, well-directed effort. I take no stock in the doctrine that either great cows or great men spring from nothing, there must be a hereditary foundation, a foundation of good ancestry, and yet, every cow and every breed of cows is to a certain extent the product of its environment.

The modern, high class dairy cow is altogether an artificial creation and like all other domestic animals she has attained to the highest excellence in the hands of the most skillful breeders. The leading breeds of dairy cows have been developed in the Channel Islands, Holland, Germany and Switzerland and in studying these breeds of cows in their native localities, this one significant fact is noticeable in every case, and that is, that wherever you find a good cow, you will find her surrounded by favorable conditions, you will find her carefully and skillfully fed, you will find her systematically bred; you will find her keeper appreciating intelligent methods, indeed, it is useless to look for a high degree of dairy excellence under any other conditions. The husbandman of the Jersey Island will neglect everything he has to take care of his Jersey cow, nothing is too good for her. The Holstein has reached her high degree of excellence largely as a result of the careful, painstaking methods of the wife of the Hollander.

There are two great forces that have produced the dairy cow,—heredity and environment,—and they are not opposing forces as is sometimes claimed; on the contrary, they work together for good when properly directed. The more we study the development of domestic animals, the more we are obliged

to believe in the influence of that power termed heredity. It has been said that no great man ever lived without having had a good mother, and it may be said with equal force that no great dairy cow was ever produced without good ancestry. On the other hand, we cannot ignore the influence of favorable surroundings, of kindly treatment, etc. I think we may say that, taking the history of the civilized nations, the great nations of the earth are the well fed nations, and we find the same force at work in the development of domestic animals. So important is this influence that I believe it possible to take the best bred dairy calf in existence and entirely ruin it for practical dairy purposes by one year of injudicious feeding. On the other hand, we may take an animal of inferior merit and very much improve its qualities by judicious feeding and treatment.

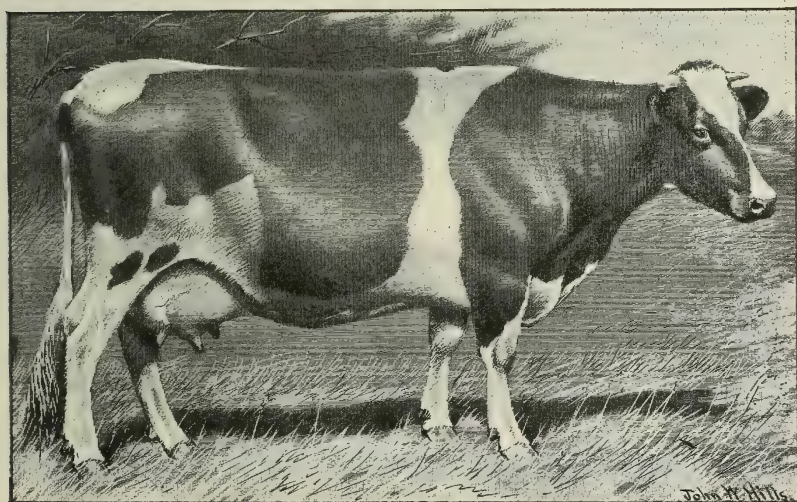
The dairy breeds that are in most common use in this country to-day, as I said, have originated in the Channel Islands, in Holland, Germany and Switzerland, and some have combined dairy and beef characteristics. These have originated under conditions that are highly favorable to the development of good cows, and we must bear in mind the fact that these breeds cannot be maintained here without deterioration unless we surround them by equally favorable influences. Then besides that it matters not how carefully we select, how carefully we breed and feed for the best results, there will always be quite a large percentage in the best bred and best managed herds that will be practically worthless. There is a tendency to reversion and that principle always operates, and I believe it operates to a larger degree with the dairy cow than any other class of our cattle, certainly to a larger degree than with the beef animal. All practical dairymen have met with that experience, and a great many more are keeping cows of that kind in their herds without being fully aware of the fact, I mean unprofitable cows.

In pleading for the practical cow I wish to emphasize the necessity of studying the breed and also the type, but I believe it is a better thing to simply study the cow for what she is, for her practical utility. It is by facts that we must arrive at our

conclusions, the truth must be the foundation of our success in any business.

I have placed before you a number of illustrations of different types of cows, also different breeds, and different cows of the same breed. These illustrations represent good cows and inferior cows; they represent cows of the dairy type, of the combined type and of the beef type; some cows that we want and some that we don't want.

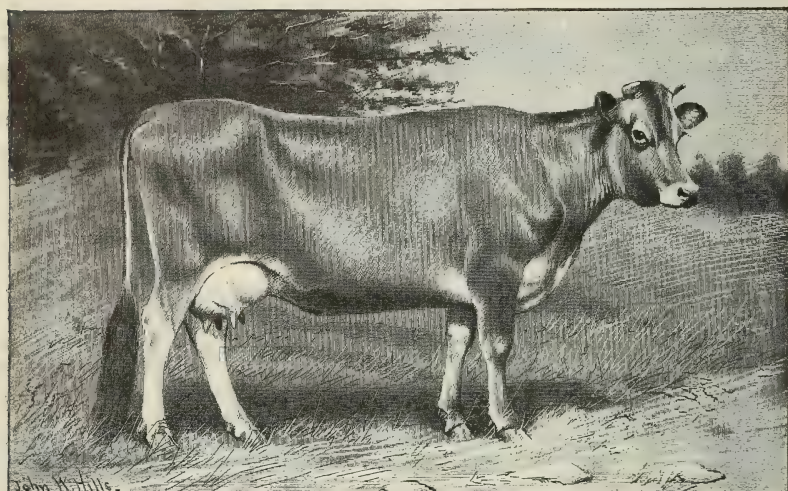
(The professor went along the line of pictures representing various cows, calling attention to certain points in each case.)



HOLSTEIN COW, PRINCESS OF BLACKHAWK,
No. 39385.

Milk record, 77-day test, 39.2 pounds per day. Milk test, 77-day period, 2.45 per cent. Butter record, 77-day test, 1.57 pounds per day,

I wish to call attention to one point in particular: This cow, Princess, has now been in milk for nearly thirty months, and during the past year has produced nearly 8,000 pounds of milk, part of the time the test running over 4 per cent. of butter fat, so that you see she is an exceedingly persistent milker.



JERSEY COW, NICOLETTE, No. 65992.

Milk record, 77-day test, 18 pounds per day. Milk test, 77-day period, 6.93 per cent. Butter record, 77-day test, 1.46 pounds per day.

This other cow Nicolette gives a not very heavy flow of milk, but is an exceedingly rich milker, the test averaged during the 77 days 6.93 butter fat, and she produced practically one and a half pounds of butter, but not for a great length of time. A few years ago, at the Experiment Station in Pennsylvania, it was found that there was great variation in that respect, and that it is not always the cow that is making the record for the larger amount of rich milk that is producing at the greater profit, or, in other words, that is the more economical dairy cow.

We have in our dairy herd now about thirty cows in milk, of five different breeds. It is our practice to weigh all feed daily from one year's end to the other and charge it

all at market price, credit the cow with the amount of milk she produces, sample it daily, test the composite samples at the end of the week, keep a record of the amount of butter fat and the amount of commercial butter and credit that at the market price; in other words, carry a debit and credit account with every individual cow in the herd throughout the year. We have cows that will make us butter for five and six cents a pound and other cows that continually charge us fifteen or twenty cents a pound. Now, I believe there is practically that variation in every herd. We know that there are cows there that are unprofitable from a dairy standpoint, but we are continuing some of them simply as an object lesson, for the purpose of demonstrating that difference in the cost of production. We can better afford than the farmers to do this and to demonstrate which cows will produce economically and which will produce at a loss.

There are some general characteristics of the good dairy cow and we need to study her, we need to study the type and the kind of the cow that is most likely to prove profitable in our herds. I am of the opinion that the best way to get a good dairy herd is to breed it, feed it up and develop it. You will notice there is a general similarity among all those cows of the dairy type (referring to illustrations) and the general similarity will best be described as what we term the "wedge" form, the "dairy" form. Cows take on that form by reason of being large milkers instead of being large milkers because they are of the wedge form. The demands upon the highclass dairy cow of the best type are such as to develop width of the pelvis, spring of the ribs and expansion of the digestive organs. These are the maternal and milk-giving organs and their development is an essential to the highest development of the milking function, consequently a practical, profitable dairy cow must take on the wedge form. On the contrary, we occasionally find cows having that wedge form that have not good dairy qualities, so that it is not an infallible evidence of dairy excellence, although it is a usual accompaniment. So the capacity of these organs is the first essential of the dairy cow; these things taken together indicate the two factors that are of greater importance in determining dairy

merit than all others combined; first, that the cow is capable of converting her food into milk; and, second, that she is capable of digesting and assimilating a large amount of food. So we must look for those qualities first. When you see a cow of this other shape (referring to a beef type illustration) you can be certain that her tendency is to convert her food into flesh rather than milk production. Then, again, we want a good development of the udder and of the mammary glands. These points are important, indeed, these, with what I have before mentioned, constitute the most important indications, although there are many minor ones. I use a score card, in which we have fifteen or twenty points enumerated in judging dairy cows. It is true that the udder does not contain all the milk that a cow produces at any given time, but only a small portion of it; but, nevertheless, the udder is the organ in which the production of the milk takes place, and a well-developed organ indicates a larger and more extensive process, and the same is true of the mammary veins, and so these two are important, whenever you find a cow which gives a large flow of milk, you will find a well developed milk vein and udder.

The color and characteristics of the skin and hair to a considerable extent indicate the quality of the milk. A highly colored, mellow, rich skin indicates a richer quality of milk and fine, silk-like hair on the back of the udder and covering the escutcheon indicates the same.

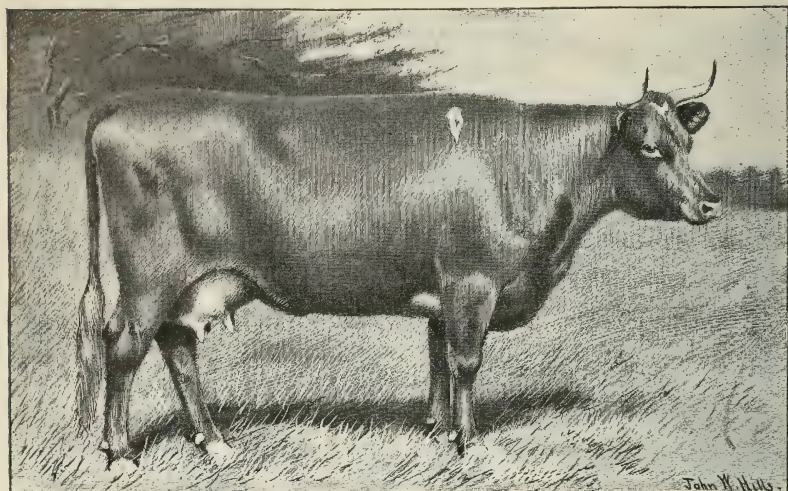
Perhaps you have inferred from my remarks up to this time that there is not any difference in breeds and that we might as well have one of those breeds as the other. I do not entertain any such opinion. I believe in breeds, but I also believe in cows, and I believe that sometimes farmers and stockmen are inclined to follow breed blindly without studying individuality enough. I believe also that for the special purpose of dairy production, where dairying is to be made a specialty, that the dairy breeds are unquestionably more economical producers. I do not believe there is any doubt but what the Jersey and the Holstein and the Guernsey will produce dairy products where we want dairy products alone, more

economically than any of the breeds that combine beef and milk. It does not follow from that, however, that every man, who wishes to engage in dairying to any extent whatever, must have the dairy breeds. On the other hand, I believe we can make a success with dairy breeds or with other breeds that combine milk and beef.

While Iowa and Illinois are among the leading dairy states of the union, they are also among the leading beef producing states of the union and there are a good many men who have been engaged in beef production, whose surroundings and the men themselves are adapted to beef production, and yet, changing conditions have forced them to utilize the milk from their herds to some extent in dairying. Many have come to the condition where it is no longer profitable to keep a cow a year simply for the calf she raises.

Now, that condition confronts a good many stockraisers and so there are a good many men who wish to combine dairy work with beef production and for that class of men I believe that the breeds combining beef and dairy qualities are practicable and profitable. Of course, you cannot expect the highest degree of excellence in either direction.

It is not for me to say which breed will be most desirable for you to use, it is not for any man to say except the man who is conducting the business, because that question can only be settled upon each farm and by the surroundings, the market, the locality, the man himself.



SHORT-HORN COW, BELLE OF SQUAW CREEK,
Vol. 36.

Milk record, 77-day test, 3.4 pounds per day. Milk test, 77-day period, 3.71 per cent. Butter record, 77-day test 1-35 pounds per day.

I wish to say, however, that to combine beef and dairy production, in one of the so-called combined breeds, is, I believe, a more difficult matter than to produce profitably and successfully from any of the special breeds, because strong tendencies will develop in your herd to convert the feed into milk on the one hand or into beef by other individual cows or even the same cow under different conditions. It is more difficult to adjust conditions and that is one reason why many men do not get satisfactory returns in using combined breeds. Here the intelligence of the feeder must come in. Laws and Gilbert have determined that from two thirds to two fifths of the increase in live weight by fattening animals is pure fat and in order to produce that fat, of course, feeds that are largely fat may be given, while the dairy cow in producing a nitrogenous product must be fed a nitrogenous ration and we must also feed largely of succulent foods. I

believe in the silo, and roots. The reason why a good many cows of all breeds do not milk profitably is that they are not fed properly for milk.

Until within the last century there were no special breeds of dairy cattle, in England. The ancients had superstitious views about eating the flesh of the ox; the Hereford and the Short-horn was the most universally used and highly prized dairy cow of England until within the last half century. So that there is back of these beef breeds some dairy hereditary yet, but it has largely been neglected of late. In this country we have been breeding almost exclusively for beef. I think I have referred to the characteristics that go to make up a good dairy cow sufficiently, except that perhaps I have not emphasised the importance of the spare thigh. A spare thigh is a necessary accompaniment of a good udder. A full round beefy thigh is absolutely incompatible with a good udder. The one precludes the other.

A good dairy cow must also be lean and angular and entirely free from a tendency to lay on flesh at the expense of milk production. She must be a cow that gives evidence of a strong nervous force, she must be nervous only in the sense of having a highly developed nerve organization, not in the sense of being restless.

I believe it will be a matter of profit to us to study these characteristics and make the most of them in all cases regardless of the breed that we may be using, and that it is not so much a matter of what breed we are going to use, as it is what we are going to do with the cow in the breed that we may select. As I say if we wish to go into special dairying then by all means use the special dairy breeds, but if the conditions are such as to recommend the adoption of dairying and beef-making combined, then we have breeds that are suited to that purpose and whatever the breed we use, it is a question of selection and feed and developing intelligently and with the utmost care and thoroughness.

I thank you, gentlemen.

DISCUSSION.

Mr. Miller: The professor has certainly given us a very able address. He has pointed out the good points of a cow, but never mentioned the milk mirror, escutcheon. I would like to ask his opinion on that, some people pay a good deal of attention to that.

Prof. Curtis: That is very true, the breeders of some breeds pay attention to it, while others pay no attention to it whatever. The breeders, for instance, of the Jersey, ignore it; they do not include it in their score card, while the breeders of Holsteins do place a good deal of stress on that point. I do not ignore the escutcheon, I use it in the score card that I have adopted for my classes in live stock, and yet I do not regard it as of nearly as much importance as the other characteristics that I have called attention to. I take it into consideration in this way, a large, extensive, well developed escutcheon indicates a large flow of milk, and an escutcheon with a highly colored skin with very fine silky hair, having a tendency to be soft and rich, indicates a rich flow of milk and to that extent I always endeavor to give the escutcheon due weight in judging a dairy cow, but I wouldn't bank upon it to anything like the extent that a great many breeders do.

Mr. Boyd; Will Prof. Curtiss be kind enough to tell us what these cows were fed during the time these tests were made?

Prof. Curtiss: We always use corn as the basis of our dairy rations, for the reason that it is the cheapest feed that we have in Iowa, and I judge it is the cheapest feed that you have in Illinois, and yet, corn alone is not a satisfactory dairy ration. We must make use of other products and while we use corn to the extent of about one-third of our grain ration, we always combine it with bran or gluten meal, usually both, and good clover hay, if we can get it, and a liberal allowance of roots, about ten pounds per day, or silage. In this experiment the ration was varied. It was to test different kinds of roots. We fed through that period four kinds of roots, to determine the

the influence of those roots upon the quality of butter, but we fed corn to the extent of about one-third of the grain ration, and bran and gluten meal as the balance. We are now feeding our cows four to six pounds of snapped corn per head daily, and six to eight pounds of a mixture consisting of equal parts of bran, barley and gluten meal, four to five pounds sheaf oats, and ten pounds of roots, and about three or four pounds of hay in addition. We always find it desirable to feed largely of roots, or silage, or other succulent food to keep our cows up in good flow of milk. Of course, we find some cows that we cannot feed like others, some that we can not feed any corn at all, when we wish to produce milk; we then withhold corn and feed more largely bran and gluten meal to prevent their developing too much fat. Then again the Holsteins produce so heavily that we are obliged to feed larger amounts of corn to keep them up in flesh, so we are obliged to make a study of the individual cow.

A Member: Do you believe it is possible to change the dairy form by feed alone?

Prof. Curtiss: I think you can destroy the dairy form by feed. I do not think you can develop the dairy form by feed unless you develop a dairy quality with it, because, as I say, I think that the dairy form is the result of a development of dairy qualities rather than dairy excellence being the result of dairy form. Still I do say you can take a dairy calf and fatten it and develop it to some extent into the beef form and it will be an impossibility to get rid of the fat, so in that way we can modify the dairy form.

The Member: I have fed and bred a great many Jersey cows and it is my experience that you can destroy the milking quality of the Jersey cow by feed quicker than any other race of cows that I know anything about by feeding them carbonaceous food.

Professor Curtiss: That is particularly the case when they are not giving milk. A good many cows are so strongly bred in the dairy characteristics that they



BANQUET, No. 354.

will make milk out of a fattening ration to a considerable extent, without taking on fat, but, if we feed them injudiciously as calves or as yearling heifers before they come into the flow of milk, they are going to build up that fleshy form.

Mr. Pethebridge: Do you know the cause of the failure in the effort to make a dairy cow out of the cow "Banquet?"

Professor Curtiss: I do not. That cow came into our herd when she was a little past a year old, and we do not know what her previous history was, except that we know that ever since she has been milking she has been surrounded with favorable dairy conditions. It is probable that she was injudiciously fed previous to that time, though there are some characteristics in her make-up that indicate an inferior cow in a general way; for instance, the very defective fore udder, although if she had not been injudiciously fed and had a higher flow of milk, it is quite likely her udder would

have developed. There is no better blood in the Jersey breed than some of her ancestry.

Mr. Stewart: Why do you keep a cow like that at the expense of the state when you are satisfied she is no good? That is a question I want to ask; another thing, you have stated that a cow could not have a nice hindquarter and be a good dairy cow. I beg to differ. A cow may have a nice, straight, handsome hindquarter and a good udder at the same time. I have imported seventy-five or a hundred Ayershire cows, I have visited the countries that they come from, and I am satisfied that you can find a nice type of that kind of cow, with straight, nice hindquarters, and yet have a good udder.

Then I disagree with you on the proposition that you can make milk and beef both. I have visited herds in England and I never found a herd that made good milkers and good beef in the same herd. You take Durhams in the country where they are used for milkers, and they are fine milkers but not good beef.

Professor Curtiss: You misunderstood me about the development of the udder. I did not mean to be understood that a cow could not have a good hindquarter and a good udder, but you cannot have a good udder combined with a thick, meaty thigh, because there is no room for the udder there. Now, In reference to this cow I spoke about, our object in keeping her was something like that of the reformed drunkard, who went about the country lecturing on temperance by exhibiting himself as a fearful example. We are simply keeping her as a warning. We want to warn people to keep away from that kind of cow, and we want to urge on people the necessity of studying their cows. On the other point, I can only repeat that I know it is possible from experiment to combine beef and milk in the dairy cow in a profitable degree.

Mr. Tripp: Could you do that anywhere except up at the experiment dairy farm?

Professor Curtiss: Yes, the whole state of Iowa is doing that to a great extent. Four-fifths of the patrons of our creameries are milking that kind of cow today. One of these cows, of which I have spoken, has in the past four months 166 pounds of butter to her credit, a net profit of \$25, and she is in good, strong flow of milk to-day, making over a pound of butter yet. Her male calves will make steers that will top the Chicago market any time. She is a better cow of her type, of course, than the average, but, then, we cannot afford to do business with average cows of any breed, we want better than the average. I know that that cow is not as good a dairy cow for special purposes as the one next to her, (a Jersey) but at the same time there is a place for that kind of dairy cow in our state. Some men are so conditioned and situated that it is more profitable for them to combine dairying with beef-raising, and I am only urging that in developing that kind of a cow it be done intelligently, that she be surrounded with conditions that are favorable to milk production. I believe that if you will apply to that kind of a herd the intelligent methods necessary, we can make good, practical dairy cows, and good, profitable beef animals.

Mr. Stewart. I differ with the Professor also on the proposition of feeding, so as to make good dairy cows. I have a herd of seventy-five registered cattle, and I raise all the calves from my best cows, yet, there are some occasionally that do not make good cows and I don't believe that any feed would make them good cows.

Prof. Curtiss: I very heartily and fully agree with you. I believe many of us are inclined to bank too much upon heredity and not enough upon individual peculiarities.

(Member: Will you please define the distinction between the dairy form and the beef form?)

The beef animal we speak of as blocky and parallel, the lines along the sides of the animal will be straight, filled out full at all points. If you stand behind the dairy cow, you will find that she is nearly a foot thicker through here (at the hips) than up here (shoulder), narrower in front

and wider behind. Every cow must be developed sufficient in front, we must have heart and lung capacity and the circulatory and respiratory system developed, but that wedge form comes from an abnormal or unusual development of the hind parts, showing that a cow can eat a large amount of feed and carry a large udder. She is wide behind, necessarily wide and deep. That is where the maternal and the milk forming organs are, that is what makes the wedge form. The beef animal must be free from that lean angular outline and present a thick, full round fleshy form.

The President: What effect has feed in producing butter fat in the milk, can you feed butter fat in the milk? I have no doubt that there are farmers in this room who think that if they will feed their cows all the corn they will eat, it will help to make the milk rich.

Prof. Curtiss: That is a question about which there is a wide difference of opinion, and I will say at the outset that whatever increase of richness has been produced in the quality of milk by feeding, has been produced rather by using feed that contains a small amount of fat than a large amount; in other words, feeding fat in a large quantity does not have a tendency to produce more fat in the milk. We have found in experiments at the station that the tendency was much more to increase the fat in the body rather than the fat in the milk by feeding fat-forming foods. There are some authorities who claim that it is an impossibility to change the butter fat in milk. On the other hand, there are other authorities who claim that you can change the butter fat contents of milk, that rich feeding makes the milk rich. We all know that variations have been developed and that that variation is very largely due to the feed and surroundings. A cow developed in the Jersey Islands gets rather scant, but rich food. The Holstein cow is developed over in Holland, where they have very rank productive conditions, heavy growth of grass and two or three crops in a year, and everything laden with moisture: the consequence is that we have there a cow producing milk that contains a large amount of moisture, and the feed, to a large extent, is the cause

of that condition; but when we take a single cow or a herd of cows, and put them up and attempt to modify the butter fat contents of the milk, it is a difficult thing to do in one generation. If that is continued a number of generations, the tendency will undoubtedly be toward variation. We are conducting some experiments along that line in our college, and we have found that in one case we had quite good results in a certain breed in changing the fat in the milk by feeding a ration of gluten meal, which is simply corn with the starch taken out of it, and we have affected the butter fat to the extent of about one half of one per cent. Similar results have been reached by use of palm nut meal at other stations and some change has resulted from the use of cottonseed meal, but on the other hand, some experiments have been conducted where they have not secured any appreciable result from the influence of feeding.

Mr. Miller: There are several different kinds of udders, there are hard udders, udders that are soft after milking, and udders that hang low down, etc. What is your opinion as to the best kind of an udder?

Prof. Curtiss: There are some authorities that insist upon an udder that will collapse after milking, milk out to almost nothing, and then there are others who contend that that is not a good udder, but I don't care so much about that point, if the udder has some other characteristics, which are important. We must have an udder that is well developed, that instead of coming to a point below, is broad and flat, and has the quarters well placed and wide apart, good width and capacity is essential. That indicates that there is large development, that there are a large number of milk cells and glands in there, in other words an organ suited to the elaboration of a large amount of milk. Then, it is important that an udder should extend well forward, and well out behind.

Mr. Miller: Some people contend that a cow whose udder stays hard after milking, gives richer milk than one with a loose udder. Is there anything in that?

Prof. Curtiss: I do not think there is.

Mr. Pearson: It may be interesting to note some experiments that have been tried at one of the Eastern Experiment Stations. For a considerable time cows were fed feed from which all the fat was extracted and they found that the fat fell off in the milk quite a little.

Mr. Boyd: How long was that continued?

Mr. Pearson: I do not know how long, I think several weeks, long enough to satisfy themselves and the weight of the cows was not changed.

Mr. Belford: Do you find that any kind of feed will have any effect upon the flavor of the butter?

Prof. Curtiss: We have been very much enlightened upon that point in recent years. It has not been long since we were told that certain kinds of feeds fed to certain kinds of cows, produced butter very much better than others. There is undoubtedly an influence following certain kinds of feed. That is, there are certain kinds that will give undesirable flavor, but the modern methods of buttermaking are more responsible for the flavors we have in our butter than the feed or breed, providing, of course, we have fairly good conditions and clean, wholesome milk. Of course we all know that oil meal fed in excess will to some extent injure the quality of butter, but take the ordinary grain rations about as they run and the butter maker controls the flavor to a much greater extent than the cow and we have even gone a step further in our creamery. You know it was for a long time supposed that it was impossible to make good flavored butter from milk from stripper cows, and we have conducted three distinct experiments in that line and have sent the butter to the best commission men, and they have been unable to detect any difference. Our butter maker claims he can make as good butter with one as with the other when the milk is properly handled.

Mr. Spies: I am satisfied that the dairyman can eliminate odors if he will cool the milk properly, and take good care of it afterwards, not put it where there are disagreeable odors. Of course, there are exceptions, such as garlic.

Mr. Boyd: Can you eliminate the flavor of musty hay by cooling?

Mr. Spies: That is food that deteriorates milk. The milk has got to be sound, of course, but if you take good, sound milk as it comes from the cow and cool it down, it will not be affected by odors under ordinary circumstances.

WINTER FEEDING OF DAIRY COWS IN SOUTHERN ILLINOIS.

BY L. A. SPIES, ST. JACOB, ILLS.

The feeding of dairy cows in different localities is influenced most by the kind of feed that thrives best in that particular locality.

Southern Illinois (like Egypt of old) is and has long been noted for its crops of corn. It is the poor man's meat, milk and flour. It yields from fifteen to twenty-five tons of the most nourishing feed per acre, for this reason I make it the basis of all my winter dairy rations adding such feeds as are plentiful and supplying concentrated food such as Linseed oil meal and Cotton seed meal to balance the ration, since these forms of food cost but little freight.

Come with me to look over the cows that I am going to tell you about, here we have large deep bodied cows that can put away good big rations and give milk as only such cows can.

We have them come fresh in the fall of the year, they give a large flow of milk during winter and in spring they keep up the quantity on the young grass, giving us most milk when dairy products are highest.

We have long since quit buying other people's mistakes, we raise our own cows, train them to be hearty eaters, and develop a sound constitution. It requires a certain amount of feed to maintain the cow's body, the balance goes to milk; the greater

her capacity to digest and assimilate food thoroughly the more valuable she is but all changes must be gradual, sudden changes from one kind of feed to another cause indigestion.

The best feeders are born with a love for their dumb friends they are men of close observation and judgment assisted in time by experience they exercise these faculties at all times when among their charge, no rules can be reduced to writing and posted up in the cows stall for the feeders *invariable* guidance if best results are to be obtained, close observation of each individual cow is necessary, it is the eye of the feeder that feeds. One glance will tell him if something is wrong and the remedy applied "an ounce of prevention is worth a pound of cure" is nowhere more true than feeding dairy cows.

The born feeder's love for his four footed friend prompts him to look to their comforts at all times, during winter evenings he takes a look at them before seeking his own pillow for the night.

He may know nothing about balanced rations but will be all the more capable if he does, but place a calf in his charge and he will make a prize winner of it where a feeder by rule will fail.

We born American farmers in these times of bustle and rush for riches find it hard to stick to our old fashioned milk stool, to look after the small details of our dairy while the Klondike fever is raging every where, born in a free land of plenty it is but natural that the seeming close economy of the dairyman does not attract the young but affluence will surely come to him who follows its ways intelligently. A neighbor of mine with a fine farm fifteen years ago, said he would never milk cows, he raised corn and wheat till his land ran down. I raised cows milked them and paid for two farms during the same time; he is now one of the hustling dairymen of our section, others are following suit.

In the last weeks of October the frost usually has destroyed the last of our green corn, a trying time for the dairy cow. At this time we open our silo of which we have two; one 16x32x20 feet deep, the other is 16x36x22 feet deep, both of wood and above ground. Our regular ration consists of forty pounds en-

silage, ten pounds bran, eight pounds corn and cob meal, and two pounds cotton seed meal, we vary these rations to suit the capacity of the individual cow, feeding morning and evening; after the latter has been eaten we feed ten pounds of clover hay and during the day they are out to exercise and are fed all the corn fodder they will eat up clean, they have access to salt and well water supplied by a windmill.

We cool our milk by running it over an areator, then setting the cans into a thirty-six barrel tank of fresh water; this warms the water for the cows, a saving of cow feed and convenience combined. We cut and cure all our corn fodder and think it has made us lots of money, for if the stalks are left in the field the leaves are lost and the shucks become weather beaten and indigestible in consequence, while the cows are turned into the field which at this season is soft in this latitude.

Some dairymen substitute corn fodder cut to one inch length mixed with corn and cob meal, and bran put into a vat or tank and thoroughly steamed then fed when cool, adding two pounds linseed oil meal. I find the manure the best indicator of the cows digestion. If it is dry she is feverish and should have linseed oil meal; if, as in feeding ensilage, it is soft we feed cottonseed meal, by studying feeds a feeder can soon see if his cows are handled and fed properly.

I would not dairy without ensilage, the silo makes it possible to have succulent feed for the cows the year around, the very kind of feed necessary for a large flow of milk and if frost should cut a late piece of corn so it would be an utter loss, the silo will save it. We frequently plant corn in clover ground after the first crop of clover has been made into hay and raise corn nearly ripe. We have cut our wheat planted to corn and it reached the dent stage.

Last summer and autumn we had a very severe drouth, too dry to germinate seed such as corn, sorghum and rye which is usually planted for fall feeding till frost kills them, to make matters worse a neighbor brought in some cattle from the stock yards affected with pinkeye, it spread to our cows, they gave less milk and looked haggard, we opened our silo, when there was

not a green blade in the country, they recovered in a short time gained in flesh and in ten weeks weighed fully 100 pounds more each than before taking the disease.

One of the necessities of every dairy is a Babcock tester and a pair of scales, for it will show which cows pay for their board and which do not; feeding at a loss is poor business, weigh and test the milk once every week, no difference where you sell your milk it should be of good quality and sufficient quantity. Our milk goes to St. Louis dealers, who retail it to private families; they test it everyday and insist on it being first-class in every respect; if it does not come up to the standard they are not slow in sending their patrons word. They are even accused by some farmers of reporting milk sour or poor in butter fat when it is all right, but on this score we were not troubled but noticed much variation in our tests of individual cows and found that we could influence the butter fat with the feed. Our chemists have taken to the dictum advanced by the German chemists Woolff and Kuhn that butter fat cannot be fed into the milk; that a three per cent. cow is so born and will so die in spite of the skill of the feeder. But now, says the Jersey Bulletin, comes the German chemist, Prof. Soxhlet, and demonstrates that it can be done and does it. This is very creditable to that organ, in fact all our dairy educators seek after truths and frankly admit them when discovered.

We, ourselves, frequently noticed the fluctuations in the percentage of butter fats in our milk from individual cows and could trace them to causes; of these feed was frequently to blame, but we often saw questions asked about the variations, and seldom did the person look for their solution in the manger.

Should Prof. Soxhlet's discoveries prove correct, our tables for feeds will need revision and the science of feeding for milk receive a setback.

We find that the silage in our ration to be cooling to the cow's system and that the grain combined with it has no bad effect, that she will remain useful long, be softer to the touch, nice and sappy, and raise healthier calves. I am now speaking of

cows under high pressure. We have imported cows, born 1883, and produced thirteen strong, hearty calves, milking continuously since two years old. We keep only cows that keep in fairly good flesh and convert all the remainder of the feed into milk, having long ago sold the beefy cows to the butcher.. I tried to build up a dairy herd from the best Durham cows, of which I had some good ones, crossing them with a pure bred Holstein male. We got some pretty good cows, but after I bought a herd of pure-bred Holsteins I got better results and find that with forty of them, with the same care and feed, my profits to be \$1,000 more annually. Some men think it spoils a heifer to feed her liberally, but if she is of a pure dairy breed and type I find that liberal feeding improves her by inducing early maturity. We have them come fresh at two years old and from that time on they are taxed to their full capacity producing milk and a calf besides; it is but reasonable that at that age she is all the better off if she has a well developed body. A man building up a dairy herd should choose from among the pure bred dairy breeds the kind of a breed best suited to his fancies and wants, and if his cows are deficient in any respect, be particular to select a sire who is strong in that particular point, viz.: inspect dam and sire, do not fail to test his dam's milk with the Babcock and scales. If you are dealing with a breeder of repute you can learn much of value of this animal's ancestry.

The Secretary: I have the honor of announcing that Mr. Spies has taken the first prize of a splendid premium offered by Kingman & Co., of St. Louis, a cutter with elevator, worth \$105, for his paper on "Ensilage and Corn Fodder." I want to read the letter from Prof. Plumb to whom were sent these papers for judging, and whom I desire to thank for his trouble in the matter.

MR. J. H. MONRAD,

Winnetka, Ill.:

Dear Sir: After going over each one of these essays with

considerable care a number of times, I have awarded the first prize to the one you have marked "Entry No. 1." Although it is none of my business I cannot refrain from saying that I do not regard either one of these essays to be worth so valuable a prize as is offered, and if I were the manufacturer I would feel sort of sick for giving prizes on such superficial essays. The winner of the first prize has without question, made very exaggerated statements, but of the three I consider that he furnished the greatest number of facts and perhaps arranged in the most logical manner. This premium was worth the presentation of a carefully prepared prize article, involving many interesting facts.

I remain very cordially yours,

C. S. PLUMB.

ENSILAGE AND SHREDDED CORN FODDER.

PRIZE ESSAY BY L. A. SPIES.

The great corn belt of the Mississippi Valley has in corn, a plant the equal of which as a forage plant exists nowhere. Its yield in grain and fodder is unlimited, it will produce from fifteen to twenty-five tons of nourishing and succulent feed per acre, the best method of utilizing it is as Ensilage and shredded corn fodder. It is the corner stone, the foundation, yes the entire structure of animal husbandry in this section; on it we can feed a horse or cow for two and one-half cents per day. We find it to be most profitable while the grain is glazed, in this state it compares with dried fodder corn as a ripe apple compares with the dried fruit, the juice is distributed in just the right proportion and is then easily assimilated by the animal's stomach. We had been feeding corn with roasting ears while they lasted for twenty-two years and were anxious to prolong their season and eleven years ago built the first silo in Madison County and we believe in Southern Illinois. Its capacity is 100 tons we were so pleased with the ensilage that in

1893 we built a second of 140 tons having in the meanwhile increased our herd of dairy cows.

The silos are both of wood above ground rat proof and substantially built, the first is twenty feet deep the second twenty-two feet deep. We cut the corn when a majority of the shucks begin to turn yellow, take direct to ensilage cutter with a thirty-two foot carrier which takes it to an opening at the top of the silo. We pack the silage at the sides and corners of the silo keeping it evenly distributed so it will settle uniformly, it will heat to 180 degrees Fahr. At this point the germ that causes the mold is destroyed the ensilage remains sweet and green, it comes out as good as it went in, the principle is the same as canning fruit or vegetables, a silo is nothing but a large fruit jar, we all know how well this fruit tastes when it is out of season and the good wife brings out some of it for us and the children for farmers always have a good appetite.

In feeding ensilage the cow does her own shucking and grinding to perfection at the minimum cost of two and one-half cents per day. "Eureka!" Here is the Klondike of Southern Illinois. There is no danger of over feeding and our cows, under high pressure feeding, are healthy as the wild buffalo on his native plain, our cows last longer than when we fed grain and hay, it has enabled us to net \$176.00 from one cow in one year after all her feed was paid for, our herd nets us \$110.00 each, they are smooth and fine as silk and my opinion is that it would make the best feed for finishing steers for market but would advise feeding about two pounds cottonseed per head each day.

After our cows had gone through that terrible drouth last fall they caught the pink eye from a neighbor's cattle which he bought at the stockyards, we were in a dilemma till we opened our silo, from that day on we increased our milk, the cows have gained at least 100 pounds each in flesh, are shedding their hair, look slick and fat, a delight to all who see them, they are mellow to the touch, the milk has a rich June color and is of good quality.

We sold it for three years to a condensary the most discrim-

inating of all markets, there it was treated separately to the entire satisfaction of the condensary managers.

For ten years our ensilage milk has commanded the highest price in St. Louis market for family retail trade. Ensilage can be made of any green forage fit for feed; the silo adds nothing to the feed put into it, but like canned fruit it preserves it in its succulent state.

Do not think of raising beets or turnips in the corn belt for feeding cows, sheep, poultry or hogs, for nothing can equal silage in cheapness or convenience; and when our farmers are ready to open their eyes they will find silage to be the sheet anchor for good intense farming; it will one day be as well understood as canning fruit, by the rank and file of farmers; it has been known 100 years and was then practiced in France.

According to Hon. J. Periam, the United States in 1893 produced 2,200,000,000 bushels of corn, worth thirty cents per bushel would make \$660,000,000.

Now good, well-cured corn fodder is worth one-third as much as the grain if fed to farm animals near where it was grown, then the corn fodder of the United States was worth that year \$220,000,000, three fourths of which was wasted, and all of this could have been returned to the fields in the shape of manure. The bulky nature of corn fodder has been the cause of this waste, but the corn-binder and the corn-husker and shredder combined have come to our rescue and will eventually help us to save the \$165,000,000 or more, for shredded fodder is worth one-half as much by weight as good timothy hay if run direct to a roomy loft or shed to protect it from rain; we find roomy feed troughs in connection with the shed a convenience. It is as nourishing and can be fed with as good results as hay, but fodder corn must be dry when shredded or it will mould. It has been finding its way to city markets shredded and baled and wherever it has been tried has given good satisfaction. Here is an opportunity for some good shippers to establish a remunerative trade.

A farmer who pastures his stalk-field does not derive one-third the benefit as if cut and shredded, for the dry, weather beaten stalks are indigestible.

DISCUSSION.

Mr. Stewart: I think you may thank your stars, as you state, that you are an American freeborn and live near St. Louis. Your paper is a good one, but if you lived where I do, your way of doing would be no use whatever. We live close to the city of Chicago, and they are not receiving any milk from us that is fed on ensilage, or made from Holstein cows; they won't receive it.

Mr. Spies: I think that the man who can adapt himself to circumstances, as Robinson Crusoe did, is deserving of a little bit of credit, although I don't want any in my case. We have got a firm in St. Louis that refused absolutely to receive Holstein milk, and there was a neighbor of mine exhibiting some Holstein stock down here and he was shipping to this same place, to the Union Dairy Company. The company has received that milk for two years and didn't know it.

Mr. Stewart: You can't trick our Chicago men that way.

Mr. Monrad: Wasn't that before the Babcock test?

Mr. Spies: This was along about 1887, and I will say that they employed a first-class German chemist to analyze their milk. They have raised their standard every year, but they are still willing to receive Holstein milk.

Mr. Stewart: How does it happen that a St. Louis dairy company which moved to Chicago won't take it?

Mr. Spies: The test requires that the milk shall not be below three per cent. and it will run from 3.25 to 3.75, along there. If your cow gets a little below a certain weight and you keep her there, your cow is going to take a living out of her feed first, and that makes her milk poor, but, on the other hand, you raise her a little bit above that, and I am satisfied that the milk will be richer. I told you that I was given two cents above the St. Louis market for Holstein milk. I will tell you why; it was because I was right in my dairy myself and looking after all the details, and then, besides that, I increased my herd largely and contracted for a large amount of milk. When the condenser started up I commenced to take my milk up there and I have taken it there for three years. The St. Louis man sent

his man down to make a contract with me, but I wouldn't contract with anybody, except at my price, and that price was 14 cents average, the year around. There were four months in the winter it was 16 cents and two spring months it was 12, but he thought he couldn't do without my milk. He said that my milk always came in sweet and in good condition and I supplied from two to three wagons right straight along. He said that when they got short of milk they could send right down to the train and take my milk off and put it on the wagons without having it tested.

Mr. Pearson: What was the average yield per cow?

Mr. Spies: We kept our accounts more by measure than by weight. If a cow would not give milk but ten months, we expected her not to go under a gallon and a half.

Mr. Monrad: Do I understand you to say that you can feed a dairy cow for two and a half cents a day? I think that is what Prof. Plumb referred to when he said you exaggerated.

Mr. Spies: You go out into the corn field and see the corn and feed it green and it will take only two and a half cents a day. I do not combine other grains with that, I just cut it and feed it in that condition.

Mr. Monrad: You mean it will keep a cow alive, not feed it?

Mr. Spies: I will feed her all she wants to eat. You take six hills of corn twice a day and you figure out how many hills of corn there are in an acre, and you will find you can do it, providing you do not value your corn over what it is actually worth.

Mrs. Mayo: I am a farmer's wife, and I want to ask a few questions. I want to know, in the first place, why there are not more farmers' wives here. This is a dairymen's convention and I know from practical experience that these farmers' wives, upon these little farms scattered all over this country, are making butter, and their product ought to count for something, and while we are here listening with a great deal of financial profit to these essays by these large dairymen, I am wondering

where the farmers' wives are. I would like to ask the question of the professor from Iowa as to which of the types of cows he has mentioned would be most profitable for a farmer upon his small farm of from forty to sixty acres, keeping from two to four cows, as many farmers do. Now, for the average farmer, who, with his wife, does the work, and the wife cares for the milk, which cow is the most profitable, and what is the best feed?

Prof. Curtiss: I want to say first that there ought to be more farmers and farmers' wives here. I believe that the farmers of this locality with forty to sixty acres of land, ought to keep more than from two to four good cows, whether of one type or another. Where he raises as much wheat as you evidently raise here you can produce all you need to feed your cows, providing you use the bran from your own wheat. I believe that either of those special dairy types of cows will be profitable if you want to turn all of your products into dairying, but, if you want to raise some beef, you can use the other type and raise profitable steers. I do not think it can be definitely stated that either one or the other would be most profitable under all conditions on a farm of that size. When a farm is larger, several hundred acres say, probably it is more difficult to convert all the feed of the farm into dairy products, then, there may be advantage in keeping some animals of the other kind; but situated as you are here, in close proximity to the St. Louis market, and with abundance of cheap feed, there is no reason why you should not send to market all the products of the farm of almost any size, either in the form of milk or butter or cheese. I recognize that not all small farmers can have a silo, but you can all raise and feed roots, though I concur with what Mr. Spies said about the advantage of a silo. I didn't see very many exaggerations in that paper and I want to heartily commend it as a good paper. The farmer on the small farm can utilize the root crop without going to the expense of constructing a silo and buying machinery, which is, of course, necessary, and then, again, the silo is short-lived, six to eight years at the best, you must have the machinery and the power, it requires an investment of several hundred dollars at least to

put a silo into operation. You can grow an acre of roots, produce from fifteen to twenty-five tons, and take them into your barn and handle them just as you would grain; they will very rarely freeze in our barns, never if the cow barn is as warm as it ought to be, and you can feed them throughout the winter, and until grass comes, and what it costs you to raise two acres of corn will grow one acre of roots, and I will guarantee it will pay to the acre more than any four acres of corn that you have. Roots may be grown also for larger herds, with profit; we grow every year from twelve to fifteen hundred bushels; we can grow them and put them in our barn for a dollar a ton and we can't grow any feed on our farm that makes us more money when fed to dairy cows and all other kinds of stock.

Mr. Newman: What kind of roots do you prefer?

Prof. Curtiss: We regard the red and the yellow globe mangolds as the best feed we can grow.

Mr. Pethebridge: In England silage is put up in stacks and covered and weighted down and I have seen some very good silage turned out. They cut down the sides and make a square stack of it, and the practice has been attended with good results and with very little damage.

Prof. Curtiss: I never have seen that done in this country. I am aware that it is practiced successfully in Great Britain, but I have never known of its being done here.

Mr. Monrad: For fear it might be thought a very good thing I will state my little experience. When I was in England I was taken down by a prominent farmer and shown his stacks. I examined them and found them all rotten about two feet on the outside. I do not think it is an economical way to handle it.

A Member: I came here from Indianapolis. I know of a gentleman who has a silo that holds 3,000 tons. This year he had too much to put in his silo and he stacked it up and he tells me it is keeping very well.

Mr. Pethebridge: Perhaps Mr. Monrad was unfortunate in striking a stack that had not been put up properly. I know my

relatives in the west of England never fail in putting up silage-stacks three times as long as this building and ten feet in width, and the results are good.

Mr. Simpson: I have been using a silo about five or six years and my trouble was always having it spoil in the corners and around by the walls; otherwise, I have been well satisfied. I always let my silo dry out thoroughly in the summer after feeding out and I see no evidence of decay yet. I cut the corn when it is just beginning to glaze.

The President: How do you account for its spoiling around the corners?

Mr. Simpson: The only reason I can see is that it is not solid enough when it is put in. I tread it but I can't seem to get it quite right in the corners.

The Chairman: Don't you think there are liable to be some airholes there?

Mr. Simpson: No, there are no airholes. I do not weight it nor cover it. There may be a foot spoiled on top.

Mr. Monrad: Are you making butter?

Mr. Simpson: Yes, my cows average me about a pound a day and three of them are two-year-olds.

Mr. Hanna: I built a silo in 1890 and having never seen one I made a little mistake. Somebody had said to build the silo a little smaller at the bottom than at the top. My silo was not as strong as it should have been; it was thirteen feet in the clear on the inside and twenty feet deep, and it sprung a little in the center, and my ensilage will mould on the outside until it comes to there; from that down it is perfectly sound. It will press against the sides above and that lets the air in.

A Member: I have had a silo for four years and the first year I had very good success with it. I always go in my silo and tramp it down in the corners. In filling I always keep the sides about three feet higher than the middle. I made a kind of a big door; I hang that up by ropes, slanting at first to one side and then to another, and so on. My silo keeps all right, hasn't shrunk a bit. I cut the corner off of my silo, so I have

no corners, and I don't believe I get a bagful of spoiled silage; we cut off the corners about eight in ches.

Mr. Shermer: In a round silo you wouldn't have any corners at all; wouldn't that be more profitable?

The Chairman: I think that a good many of the new silos are made round, perhaps more than square.

Mr. Monrad: Down in Indiana I met a gentleman who had a round one; it had twenty feet staves and was ten and a half feet in diameter. He fed about twenty-five head.

HOW TO INCREASE THE PROFIT OF OUR DAIRIES.

H. B. GURLER, DE KALB, ILL.

(Read by Mr. Joseph Newman in the absence of Mr. Gurler.)

That there is need of increasing the profits of our dairies all will admit. How to do it is an important question,—one that thousands of dairymen are studying and many thousands should be studying it that are not.

With our present available information as to how we may improve in our work, we should and are improving faster than at any previous period in the history of the dairy work of our country.

The dairy herd as we find it on the farm is the foundation on which we as a rule must build, or rather it is that from which we are compelled to select material for the foundation of our future herd.

There are many ways in which the profits of most herds may be largely increased. The first thing I would recommend a dairyman to do is to make himself acquainted with each individual cow of his herd. By this I do not mean simply that he should know each individual cow but that he should know what quality of work she is doing for him; whether she is making him

a profit above the cost of food and labor or not. If she is not, learn why she is not; whether it is her lack of capacity to handle enough food or whether she is not being properly fed and cared for.

When these points have been demonstrated we know what to do. It is an important matter for us to know whether the cows are being properly fed or not and if not to remedy it. It is surprising to know that so many dairymen do not pay more attention to and know more about this point. The question of the capacity of the individual cow to do profitable work is not a simple one to determine, but this requires no more business ability than it does to make any other business profitable. The profit is what is left after expenses are paid; the cow intelligently handled, that leaves no balance to her credit after food and labor are paid for, should be sold and one put in her place that will leave a profit.

There are herds of cows in the United States that average 400 pounds of butter annually per cow, and herds in nearly every community of the Dairy Section that average 300 pounds annually. These 300 and 400 pound dairies should be object lessons to other dairymen. What one dairyman or dairywoman has done, another can do.

We should all use the scale and Babcock test on each cow of our herds. In this way we shall know what each cow is doing and this is the only practical way of knowing.

It is necessary that we know what it costs us to feed a cow a year. To this add the cost of labor and then balance the account and see whether the balance is on the right side or not.

I find it unprofitable to keep cows that do not produce above 200 pounds of butter annually. I might have 100 cows on my farm that would produce 200 pounds of butter each annually, and not make anything from the whole herd. We will put the cost of feed at \$30.00; labor at \$10.00; interest, \$2.50, and we have \$42.50, from which we will deduct \$10.00 for skim milk, leaving \$32.50. We will put the average net price for butter at 16 cents per pound and we find we must have 203 pounds of butter before we have any profit for ourselves.

Now please tell what sense there is in keeping cows when we know there is no profit,—or I might say what sense is there in one not knowing what cows pay us a profit and which cows do not pay a profit. No other business in this country would stand the lack of intelligent work that our dairies do. I believe there is more need of intelligence in dairying than in any other line of farm work. There is no point in which there is not an equal need of intelligence, and when it comes to the point of figuring the profit or of studying to increase the profit, there is more room than any other place in the whole line of agriculture. Why more dairymen do not improve these opportunities to help themselves I am at a loss to understand. No manufacturer could withstand the competition he has to contend with if he left unimproved opportunities, like most dairymen are doing, in not testing their cows and knowing what each cow is doing for them. Did you ever think of the farmer as a producer, as he is in growing his crops, in which work there is use for great practical knowledge and skill. Next, as a manufacturer, as he is when he employs his farm animals to manufacture his coarse fodder and grain into milk, beef, pork, etc., and with the dairy as he manufactures, as he does in some cases, his milk into butter and cheese. Next, as a salesman, as he must be when he sells these products of the farm. It seems plain to me that the successful dairyman of the future must be the brightest, brainiest man of the whole list. He must be a master of details. I wish to impress upon you the comparative profit of cows that make 250 pounds of butter annually and those that make more. The 250 pound cows leave fifty pounds for profit and the 300 pound cows leave 100 pounds for profit or twice as much as the 250 pound cow, and she is worth twice as much—yes she is worth more than that. If properly bred she will bear calves that will make 300 pound cows or better. We certainly should weed out the cows that are getting us in debt, after which we should and would continue to weed out until we get a profitable dairy.

When I first tested my dairy the average make of butter per cow was 150 pounds, and this testing was done by setting each

cow's milk by itself and skimming and churning it separately. This made much work but it paid. For the year of 1895 the cows of my dairy that were four years old and over averaged 329 pounds, and the average of the entire herd was a little over 300 pounds per cow. This work must be taken hold of with a grip that allows no slipping, when it will prove not only profitable but instructive. I found cows in my dairy that would eat up the profit of another cow that made 265 pounds of butter per year. The two cows paid me nothing. When the poor one was sold the better one paid me \$12.00 to \$15.00 yearly.

There are thousands of such cases in the dairies of the United States. Here is a matter in which we can help ourselves. Here we can come nearer lifting ourselves by our boot straps than in any other way I can think of. We do not need to ask for legislation unless it is to compel us to improve our opportunities. Some of us need this without doubt, but we would rebel against it of course. That is man nature—foolish man nature.

I believe it is entirely practical to secure by a few years persistent, intelligent work, a dairy that will produce an average above 300 lbs. of butter yearly. After we have learned the ability of each cow for profit we are in shape to help ourselves by intelligent breeding.

Remember always that the bull is one half the herd when it comes to raising calves, and do not let a few dollars come between you and a choice animal. I breed to have the heifers drop their first calves at two years of age. I believe I secure better milch cows in this way than by waiting until they are a year older.

Unprofitable cows should be fattened while being milked. This can be done by heavy feeding, and there is less loss by so doing than any other way I have learned of.

The point that has most frequently attracted my attention is the palatability of the food. This is the key to the situation and must be closely looked after. A satisfactory profit comes with a palatable food, and it does not come without it, for the reason that the cow will not consume enough above the food of support to make a satisfactory profit.

Most dairymen cut their hay too late, or when too much matured to make the most palatable food, and to secure the best profit from feeding the cows, hay should be made when the grass is in full blossom. I have never been able to overcome the mistake of cutting hay too late. An increase of ground feed does not accomplish it, but at the same time it adds to the cost of food in most sections of the west.

Corn for silage should be cut between the denting and glazing stage. I am confident that it then contains the most available or digestible nutriment. I like to have it as far matured as we can and have the cows digest the whole grain in the silage, and I think there should be a plenty of this grain or corn in the silage. I now plant less than one half as much seed per acre as I did ten or twelve years ago. In this way I do not secure as much food per acre of corn, but I do believe I secure more profit per acre when it is fed to the cows.

I am an advocate of warming the drinking water for cows in cold weather. I have practiced it for several years. I am sure it pays. It increases the profit and decreases the risk from sickness. A cow can safely drink all the water she wants at all times when the water is at a temperature of eighty degrees Fahrenheit or above.

For many years my practice has been to have my cows drop their calves in September to December.

I think the advantages of winter dairying over summer work are not as great as they were several years ago, and still I think it advisable to have the cows fresh in the autumn months in place of the spring months. The cows will produce more milk during the year. They will give milk a longer period when they are dried off on pasture than they will when dried on winter feed. Winter dairying helps to equalize the farm work. We can keep the help all the year and secure a better class of help by giving employment the whole year. This is a matter of no small importance.

When my cows are dried off on pasture without any grain food I have very seldom had any milk fever, but when I feed

grain during the dry period I frequently have trouble from this source. Dr. Leonard Pierson of the Philadelphia Vet. College warns dairymen on this point. The cows should have all they wish of a proper food at all times, but keep the grain from them when they are dry previous to parturition.

The cow stable should be kept at a temperature above freezing at all times. On this point I quote from the London Dairy, in which Mr. Alexander Potter gives the results of some experimenting with temperatures of stables. He says a temperature of sixty-three degrees gives the best results. He says that in one case with thirty cows the value of the milk was \$15.00 per week more when the stable was kept at sixty-three degrees than when it was kept at fifty-two degrees. I have used the neck ties and stanchions, but have discarded them, and am now using the Bidwell Stall. In my new stable I have cement floors, gutters and also cement mangers. I have individual stalls which have some of the Bidwell ideas, some from the Drown stall, and some of my own ideas. The stall partition is entirely of iron, a No. 7 double crimped wire, woven onto channel iron frames.

Very few dairymen appear to realise the importance of the work of milking,—the necessity for kindness, neatness, system and regularity.

I have found a difference in milkers in the matter of keeping up the flow of milk, that was alarming, sufficient to pay a man's salary when he milked 15 cows for a year. Some milkers can and will keep up the flow of milk of their cows. Others can but don't, and still others cannot when they do their best.

Two seasons I offered prizes for my milkers to compete for, and secured the best work I ever had.

SKIM MILK.

There is one point that I have given much thought during the past three years. When I started the enterprise at my farm of producing certified milk I adopted the plan of having each milker cleanse the udders of the cows he milked before he com-

menced milking. The cows had been tested with tuberculin previous to this.

When we commenced the certified milk work we noticed that there followed a shrinkage in the flow of milk that was a surprise to me, and I could not account for it. My first thought was that it might be a result of the tuberculin test and I was worried about it, but after giving the matter thought and getting information from several sources I reached the conclusion that I must look elsewhere for the cause.

We noticed after a time that this shrinkage commenced immediately after the cows were put in the stable in which the cows were kept from which the certified milk was produced. The business commenced small and the cows were not at first all put into this stable, but were transferred from another stable at times when needed.

This set me on another line of thought and convinced me the cause was in the treatment of the cows in some way, and the only difference in the work between the two stables was in the milking, and I soon had the trouble corralled. About this time there was a discussion in Hoard's Dairyman about the bad effect of manipulating the cows udder except immediately in advance of milking, for the reason that it stimulated the secretion of milk by the cow, and nature's effort was not assisted by relieving the cow of the milk as secreted, and the effect was a damper on nature's effort and resulted in a decrease of the flow of milk.

After due deliberation I changed my plan of work in cleansing the udders, so that now I have a man who does nothing but cleanse the udders and does it just in advance of the milkers. The results are now satisfactory.

Mr. Newman: I want to say to the farmers here that I am very sorry that Mr. Gurler is not here, as we could receive a great deal that is valuable from him, but I do hope that you will get his book on dairying. You can get it from your newspaper man and it will be of great value to you.

Convention adjourned to 7:30 P. M.

Convention met at 7:30 P. M.

The president in the chair.

Piano solo, Miss Tillie Boebeker.

Song, F. G. Erfurt.

HOW TO KEEP THE BOYS AND GIRLS ON THE FARM.

MRS. MARY A. MAYO, BATTLE CREEK, MICH.

All over this broad land of ours, upon the beautiful highways, where well-tilled lands speak of industry, thrift, and what may be its associate, comfort, down the by-ways where small crude homes tell of toil, industry, and, perhaps, a larger share of comfort, there are bright-eyed boys and girls who think, ponder and dream the long, long dreams that always come to the intelligent youth.

There are boys and girls in these homes who grow restless, their feet are impatient to walk in other ways,—life upon the farm is not the life for them. They are only staying until they arrive at their majority, when they may and can turn their backs to the farm and set their faces toward town or city and their hands to other toil than their fathers have known.

Our farm homes are often depleted of our brightest and fairest, which the city or town gains. The son or daughter born to us in mature life, upon whom we had hoped and expected to rely when the infirmities of age steal so unconsciously upon us, slip away from the old farm home for life and work in shop, store, factory or office, and we are left to ourselves, without children, and, from force of circumstances, which we think beyond our control, the farm is rented, or, worse, sold, and the father and mother suffer removal, which is like tearing up an old tree by the roots.

Fathers, mothers, sons and daughters, these things ought not to be. There are exceptions we know, and thank God that there are. Now, where lies the cause? We think we need



MRS. MARY A. MAYO.

not go far to find it. It is a good thing once in a while to have a reckoning with ourselves. We frequently chide and blame others when they are not to blame, we often lay things at other's doors, when they are to be found at our own hearthstone. Is it the fault of the boys and girls that they leave the farm, or has there, through every year of their young lives, been a sure but slow process of weaning them from it?

In childhood the child loves life in the country, it seems to be the legitimate life for him. He loves the sunshine and the rain, the grass, the birds and the flowers; he loves the woods and fields, every animal upon the farm possesses a rare charm. He revels in fruit and fun, and life is all a gala day, but when this young life must begin to share the toil of the farm, when he must become a part of its machinery, bearing its burdens, and, shall we say, sharing its joys, the love for it grows gradually weaker and weaker until soon he wonders if there is anything in it that can make life on the farm endurable.

There must be an education for the farm and to the farm. The successful farmer to-day must be an educated man. He must make a special preparation for it, not only that he may make a success of the farm, but of the farmer. His boys and girls are thinking, reasoning beings; their eyes are quick to see; their ears quick to hear. Have their faculties been trained for the farm that they may succeed as farmers, and above all as men? Has their school life been such as shall fit them for the farm, and let me ask, has their home life been such as shall bind them to the farm with bonds that can only be severed by death? Now, friends, we do not want to talk sentiment but fact.

Would you be willing to trust your life or the life of your child in the hands of an unskilled, untrained, uneducated doctor? Would you trust a case at law in the hands of an attorney in whose ability you had no faith because of his lack of knowledge of law and jurisprudence? Would you be willing to ride over these great trunk lines, with their almost incessant rumble of trains if you did not know that skilled hands held the lever and that men,

thoroughly educated in railway work and all its departments, were despatching and managing successfully the rolling stock of these roads?

These sons and daughters of ours must be trained and educated to a love of the farm. How can this be done? If you are able, send them to such schools as shall instill into them a love for labor. Send them to schools of agriculture, to agricultural colleges where the developing of the mental faculties is joined to a trained eye and a skilled hand,—a hand skilled in labor. I find some fault with our high schools. I think they really educate more of our young people away from the farm than to it. They do not usually send its pupils back to the farm home with elevated ideas as to the dignity of labor, but they do go back sometimes with only this thought,—only to stay until they can find something else to do, something that savors less of work than life upon the farm. To keep the boys and girls on the farm we need to make our country schools better schools. Let the farm stock serve as object lessons. I would teach elementary agriculture, plant life, the chemistry of soils, the chemistry of the kitchen, growth of seeds, growth of buds, and in every lesson, there should be an idea impressed of labor; that everything must labor in some way, that it is one of the fundamental principles of this universe. Then, if able, let the agricultural college succeed the district school. There is no reason why such a girl or boy may not go directly from the common school to an agricultural college. Some will tell you—but they are generally persons who do not know—that agricultural colleges educate away from the farm. This is not so, especially it is not so as regards the agricultural college of Michigan.

But there are many of us small farmers,—and if not small farmers,—our circumstances are such—ill health, indebtedness, mortgage upon farm, a large family of younger children that must be cared for—that the son or daughter must end school days with the common school. What next can we do to keep the boys and girls on the farm, and not only on the farm but of the farm because they love the farm.

I believe just here and under just these circumstances that

we fathers and mothers have a great work to do and one reason why so many of our boys and girls have left the farm is because it has not been done.

Fathers and mothers, what is *your* attitude to farm life? Do you feel that it is a moloch to be fed and that to it you must give every energy of your being, your time, your thought, the whole of yourself, that it must be one continual grind, grind, from year's end to year's end, that you must not only dig yourself but compel every member of your family—wife included,—to dig just as you do and for the same and only purpose,—for money—and when you get that money, plant it right in the bank, don't spend any of it buying a piano for your daughters, or a wheel for the boys, or to even take yourself and wife and the boys to the dairymen's association; don't buy any books or take any more magazines or papers—the boys and girls might fool away their time reading them, might possibly learn something that you do not know and want to put it in practice. Just keep on, working and grumbling—grumble if it rains, grumble if it doesn't, grumble if you have to work, and grumble if you should be sick and could not, grumble if you think the boys have shirked a little on a day's work, because they wanted to quit early and go somewhere. Be sure you grumble if they want to take a horse and more if they hint that they should like a carriage. Above all, do not give them—the boys or the girls—any money. Let them know it comes hard and goes harder. Be cross and grumpy if company comes, especially young company. Keep telling what a dog's life a farmer's life is, how you hate the sight of the farm, and only farm it because you have to, and you are in a fair way to aid your last child to leave the farm, and who could blame him?

On the other hand can you look your bright boy in the face as he slips between your knees on a winter evening and say, "My son, I live in the country because I love the country, I work upon the farm because I love the farm. Every field is a friend tried and true. I know these fields so well that I can count to almost a certainty as to what they will return to us, for the labor and care I shall bestow on them?" Return to us. I like to hear

fathers and mothers use this word. Is there any partnership between yourself and your boys and girls in the farm? Or is it all yours, and will be theirs when you are through? If it is not now, but will be, the chances are that it will never be.

I don't know of any better way to keep the boys and girls upon the farm than to keep in them an intelligent love for everything upon the farm, and I don't know of anything that begets love any better than personal possession, the knowledge that it is "mine."

Then there is the ethical side to consider. These boys and girls are getting these lessons every day, either of love of the farm or hatred for the farm. They will get a great deal of that from you. Are you in the habit of saying, "I always hate to go into a certain lot." Your children are watching you, they can tell when you look over your fields or talk about your garden or something else in connection with your home, whether you love it or dislike it. Have you thought and talked about nothing but money, money, money in connection with everything upon your farm, or have you thought and talked about the birds and only condemned them and begrudged them a few grains of corn? If you cannot see the beauty that is all around you, if you cannot hear the melody that is in the song of the bird and do not talk of these things to your boys and girls, they will, like you, never see anything but the sordid side of things. I can hear someone say: "I want to get where I can see pictures and listen to good music." There is most exquisite music upon your farms, most beautiful pictures lying before your eyes, if you only have ears to hear and eyes to see.

Only let your boys and your girls feel through you that the farm is something to be loved and enjoyed, something to be held always as sacred as life itself.

Song: Mr. Jules Lombard.

Piano: Miss Clara Schrieber.

Song: Mr. Erfert.

Piano Solo: Miss Jessie Dunn.

Song: Mr. Jules Lombard.

Duet.

On motion of Mr. Monrad, a vote of thanks was tendered to Messrs Lombard and Erfert for the music furnished by them.

Adjourned to nine o'clock A. M. next day.

The Convention met at nine o'clock A. M., Jan. 12, 1898.

The president in the chair.

PRACTICAL DEMONSTRATION IN MODERN FARM BUTTERMAKING.

BY MRS. R. A. PETHEBRIDGE, ST. LOUIS, MO.

(Accompanied with explanations and remarks by Mr. Pethebridge.)

Mr. Pethebridge: I think there can be great improvement made in the way of farm butter making in this country. All farmers are not so situated that they can send to a creamery, or to the city, and there is no reason why the farmer and his wife cannot turn out the very finest possible goods, because he has his own cows and he can treat them as he wishes and he has command of everything, the feed, the handling of the milk, which is the most important thing, and everything else connected with the process. The beginning is where the improvement has to be in the care of the milk, and he should study dairying from the commencement to the end, and the fact is that if you are only once educated it is just as difficult for you to go wrong as it is to go the right way to work. I am going to demonstrate the system that is practiced in a small way in making butter upon the farm.

The first thing to do is that the churn and butter-worker should be soaked in cold water from twelve to twenty-four hours. After that they should be thoroughly scalded with as hot water as you can possibly get, then not allowed to dry off, but simply cooled off with cold water.

Then the next question is: The proper stage for the ripening of cream, and that is a very important question. I have three samples here, showing, the first one where the ripening has not progressed far enough, another where it has gone too far, and the third, the cream we are going to churn is just right. (Those interested sampled these.) Strain your cream, before churning, through the proper-sized strainer, or your butter is likely to be streaked, or there will be little lumps of cream that will not churn, that will make your butter mottled and streaked. The strainer cloth that I have is not the ordinary cheese cloth but it has the proper-sized mesh for the purpose. If there is any difficulty in straining add a little water. I get this cloth in St. Louis, it costs ten cents a yard. I ask for strainer cloth and get it all right. It is not cheese cloth.

Now, you have your cream in the churn. This cream was put in at a temperature of fifty-four degrees. The temperature of this room is sixty-eight; of course, you have to regulate the temperature of the cream according to the room. The butter should come from an ordinary churning in about thirty to thirty-five minutes. A little butter color should be added according to the market you are making for. We reckon about an ounce of butter color to about forty-eight pounds of butter in our part of the country; it should be probably a little less in the north.

The Chairman: The amount of coloring needed depends a good deal on the feed of the cows, does it not?

Mr. Pethebridge: Yes, quite so. At this time of year there is not much color in the cream anyway. In June we do not need to add much. In the case of no-salt butter you do not put in any color. We have in the city a large demand for that kind of butter which is perfectly white.

When you commence churning, at first about every second round you want to let off the spurious gases from your cream, stopping when you find the gases cease to come up, as they will after a little. Ventilation is always important in churning. You want to start a little slow at first, get your cream thoroughly mixed before it begins to break. After you have been churning

five minutes or so, take the temperature of your cream to see whether it needs to be warmed or cooled.

Mrs. Mayo: Will all cream churn in thirty minutes at that temperature?

Mr. Pethebridge: No, it depends entirely upon the breed of cows. Jersey cream will come quicker than Holstein or Ayreshire.

The Chairman: Do you know the per cent of fat that was in that cream?

Mr. Pethebridge: I have not tested it, but Mr. Welford tells me he calculated it was about twenty-five per cent fat. The per cent of fat in the cream, of course, would have something to do with the time it takes to churn. Thick cream will come quicker than thin because the fat globules are closer together. In slushy, washy cream the fat globules are far apart, and it takes longer. The fat globules are enclosed in a small envelope of caseine, and the friction, the rubbing together, is what we are trying to do.

The Chairman: I notice that the dairymaid is a little more particular in giving that churn vent than many creamery men are. I have seen the cork come out of its own accord before the boys got around to take it off. They think if they take it out twice they are doing pretty well.

Mr. Pethebridge: If any one doubts what I say in regard to straining the cream he has only to look at the cloth through which it has been strained and see the lumps that are left in the cloth.

Mr. Monrad: Do you think it is necessary in all cases to strain your cream? I do not think it is myself. I have made a good deal of butter without straining where the cream was perfectly smooth. There is a difference in the acidity; where you see the little white specks in the cream it should be strained certainly. Of course it is needed always for flies and such things but not for white specks if the cream is handled right.

Mr. Pethebridge: I think that the cream should be strained every time and you are sure of being on the right side.

Mr. Spies: Doesn't it make a difference as to whether the cream is raised by the gravity process or by separator?

Mr. Pethebridge: No; in separator cream there is likely to be a little foam, and in the gravity process there is likely to be little lumps, so it is best to strain it in either case, and it sometimes makes the difference between making good butter and inferior butter.

Mr. Judd: Do you have separators where you come from in the old country?

Mr. Pethebridge: Oh, yes.

Mr. Curran: What about streaks in butter?

Mr. Pethebridge: There is no necessity for any one to have streaky butter. You may perhaps get a little chill on before you have a chance to work it, in that case put it in a warmer temperature before you work it and you won't have streaks, although your butter may be a little overworked, but that is better than streaky. The temperature for washing butter should never be below forty-five in the summer, and in winter according to the air you are working in. The danger is of using water too cold and that is one of the causes of streaky butter. At any rate, it is caused after the butter comes from the churn.

Mr. Miller: What is the cause of bitter cream?

Mr. Pethebridge: I should say there are forty different causes. I know one of the causes is mixing warm morning's milk with cold night's. Another is keeping the temperature of the cream too low. Sometimes the cause is in the feed of the cattle, too much dry feed, and there are other causes undoubtedly.

The Chairman: We are shipping cream to Chicago. When I was in Chicago the other day, Key & Chappel said they had had some trouble with bitter cream of late, which is something entirely new, though we have shipped a great many years. After inquiring into it we have laid it to the age of the cream. We have a chemical cooler and that cream is held at the creamery three or four days at a temperature right down to freezing. Whether it is that or whether it is some every-other-day milk, we can't tell.

Mr. Monrad: The only time I ever had bitter cream was when I held it for several days at a low temperature. If you ripen it quickly between twenty-four and not more than forty-eight hours, you will seldom be bothered with bitter cream.

The Chairman: This cream went to the bon ton people on the boulevards, like Mr. Potter Palmer, and they eat it on warm oatmeal in the morning and that develops the bitterness.

Mr. Miller: I heard it stated that frozen cream would invariably be bitter. I have heard another gentleman of a great deal of experience say that if there is one certain cow in a herd that causes the bitter cream, by eliminating the cream from that cow the rest will be sweet.

Mr. Pethebridge: Our cream has now come to the stage just before it commences to break. You see, it sticks on the cover and the sides of the churn. We will churn that about five minutes longer, very carefully watching the observation glass to see the very moment at which it begins to clear. Two turns of the churn at this stage will spoil the butter.

A Member: Has anyone had trouble with cream when the cows have fed on clover pasture? Mine have fed on clover pasture and hay for forty years and I never had any trouble.

Mr. Pethebridge: You very rarely get bitter cream when your cows are running to pasture. It is almost always in cold weather.

Mr. Major: Do you stir the cream when it is ripening? I think that is an important point in flavor.

Mr. Pethebridge: Most decidedly, it should be well stirred in the process of ripening. And another thing is important, provide an earthenware crock or enamelled bowl to ripen your cream in. In farm dairying, where perhaps you have two or three gallons of cream to churn at a time, it is most important, because it adds to the quality of your butter. The acidity of the cream acts upon a tin utensil and gives it a sort of a "wheyey" flavor, it takes the richness from the flavor of the butter. Whenever you add cream to your crock, stir it thoroughly, mixing it four or five times a day, give it a little stir whenever you go by, not so violent as to churn it, and keep it in a fairly cool place. This

is while you are gathering your churning. Keep it together for at least twelve or twenty-four hours previous to churning, so that the whole mass shall be equally ripened; otherwise your grains will be uneven in size.

Mrs. Mayo: Provided we wanted to churn and had our cream already with the exception of the last skimming, would it be wise to put that last skimming in with the rest that has been repeatedly stirred for, say, three days?

Mr. Pethebridge: No, not if you are going to put it right into the churn. If you are going to keep it twelve hours or so longer, it is all right.

Mr. Spicer: Is not washing the butter in water that is too cold one of the causes of mottled butter? I think it is.

Mr. Pethebridge: I think streaks come in the butter more from the way it is handled after it is churned. Butter properly salted and worked ought not to have streaks.

Mr. Monrad: Do you like the churns that will bring butter in ten minutes?

Mr. Pethebridge: That is rather a leading question, but still I do know some churns that will bring butter in eight or ten minutes that have made some of the finest butter that has ever been turned out, but they want to be in the hands of experienced people. You could put this churn that we are using into anybody's hands and with ordinary care they can handle it, but with these churns you ask about, the chances are they will simply make a mess of it.

A Member: A smaller churn, holding, say, 200 gallons of cream, will churn more quickly than a 500 gallon churn.

Mr. Pethebridge: You have got to judge about those things. There is no use putting two or three gallons of cream in a great big churn; it will stick to the sides and you can't get any good of it; you have got to have sufficient in the churn to get the friction, but, in any churn if you put in too much the chances are that your butter will take a very long time to come and your buttermilk will be very rich when you get through. You must use judgment about it.

The Chairman: If you have too small a quantity in your churn, you have got to reduce your motion in order to get the churning. The same way with the churn that is overloaded.

Mr. Monrad: Supposing I am a pioneer farmer and only have one kitchen and a bedroom, how am I to keep my cream warm?

Mr. Pethebridge: I think the general rule is to ripen the cream beside the kitchen fire when the weather is very cold, but I would prefer ripening it in a cellar, or something of that sort, providing there are no bad smells, which you must guard against.

Mr. Spicer: Hang it down the well.

Mr. Pethebridge: That wouldn't ripen it in twenty-four hours perfectly sweet.

Mr. Monrad: I am interested in this, because I have been there myself. A good many are so placed that it is hard to keep the temperature of the cream up to where it will ripen. Let me suggest this. Warm your cream to sixty-five degrees, or wherever you want it, then have a drygoods box filled with hay and just put your can down in the center of the hay and cover it up and that will keep warm for quite a long time. In the summer time, when my wife cooks a ham, she had a box with hay in it and she will get the pot to boiling real good and then she puts the pot down in the box of hay and the ham will go on cooking, and she need not keep the fire up. It will cook in three or four hours.

Mr. Tripp: That is a fine way to boil a ham, but how are we poor fellows going to boil ham if we haven't got any hay?

Mr. Monrad: You can use cotton or anything that will keep the pot warm. This was invented by Prof. Fjord of Denmark, that method of cooking, and it is an economizer of fuel and time. In that country the housewife often goes out to work and she can start the dinner to cooking and leave it for several hours.

Mr. Tripp: That is the way the Chinamen keep their tea hot.

Mr. Monrad: We have learned a good many good things from the Chinamen.

Mr. Pethebridge: We have now reached another stage in the butter making. Be sure and strain all the water before you make use of it for your churning. You will see the necessity of that every time you strain, there is always some sediment, and that means black specks in the butter.

A Member: What is the difference in the effect on the butter if you churn slowly or fast?

Mr. Pethebridge: It will take longer to come when it is churned slowly. If you have a full churn you want to churn a little faster than if you have rather an empty churn. You have got to get your friction to release the globules. Now, we will wash down the churn.

Mr. Bates: There is a churn now that makes butter from milk. Is that a success?

Mr. Pethebridge: I don't think so. There was a party at one of our creameries, showing the farmers what he could do with that churn. It is just an open pail. I asked the question as to what we would do in a warm temperature with an open churn like that, and he said, "The motion creates a circulation that cools it." "Well," I said, "I guess not, all the friction you can create there won't lower the temperature one iota." We had some further talk and I pinned him down quite close, and I said, "I will bring some cream down from the creamery after dinner and we will make some experiments, see what you can do." He says, "All right." After dinner I went down and he was gone and that was pretty good evidence to me that he was a kind of a fraud. At any rate his churn would not be what a farmer could use. You can't churn in an open pail in a place where there are flies and dirt.

Mr. Boyd: That question can be answered in another way. Any churn will make butter from milk if the milk is ripened as the cream is and it will churn just as exhaustively.

The Chairman: These people claim that they make butter out of perfectly sweet milk and I guess they do, but the idea of their getting one-third or one-half more I am sure cannot be carried out.

A Member: What effect will it have if ice is put in cream in small pieces?

Mr. Pethebridge: It entirely depends upon what stage your cream is in. If the cream is a little thick and a little warm, I don't think it will have any material effect, because it will simply dissolve and bring the temperature clear down. Of course it wouldn't do for the ice to be taken from a stagnant pond, or anything of that kind. The cream has come to a stage now at which the buttermilk can be drawn off. You will find the grains a little smaller in the winter than in the summer. This butter came at 58 degrees, a proper temperature, and I wash it in water at 52; the temperature of the water regulates the size of the grains at the first washing. Of course the salting is a matter of taste. In this country the custom is about an ounce to the pound; in England the quantity is only from one-quarter to one-third of an ounce to the pound. We salt in the churn. Then put the butter on the butter worker. You must be careful in working it not to grease it.

(Mrs. Pethebridge worked the butter on the lever butter-worker, donated by Cornish, Curtis & Green Mfg. Co., and made a neat pound print with a pair of small ladles, "Scotch handles.")

We have now got practically through with the buttermaking and now comes the washing up, which must be very particularly attended to.

I want to suggest one more thing, and that is that each one of you adopt a trademark, so that when your butter goes into the market, in any part of the country, you are able to swear to it. Be careful to make it uniform, make it attractive looking, catching to the eye. In that way you make a market for your butter and get the top price. Mark with a print, all prints alike, of course. Pack it nicely when you send it to market. If you turn out a good quality of butter and make it look nice, and send it to market you will have no reason to complain about low prices.

DOES DAIRYING PAY IN SOUTHERN ILLINOIS?

W. K. LYONS, MARISSA, ILL.

Dairying in some form has existed in Southern Illinois (in this immediate vicinity, at least) almost since the first settlement of the country.

True it is that this form of industry in those early days was beset with very many difficulties, chief of which was the exceedingly low price to be obtained for the manufactured product of the cow. The facilities at hand also were of the most crude sort. Yet, notwithstanding all this, many a family was enabled to lay well the foundation for a financial competency, very largely as a result of their attention to the cow and her lacteal product.

In the days of our boyhood, back in the fifties, we recall that there were families at that time who milked herds of eight to a dozen cows and such families were usually thrifty and prosperous. Moreover, the churning was all done in the old fashioned dasher churn. At that stage of the business, such a proceeding as keeping the cows in a barn, even during the milking hour, was not even thought of, much less suggested. Milking was done in the open lots after the calf had been allowed its rations, and in very many instances under many trials and tribulations of kicking cows, hooking cows and other misdemeanors common to the more or less tamed bovine.

Calves in that day and generation were not shipped to the city butchers as at present. Neither had the system of feeding the calf or raising by hand been introduced at that time.

Marketing the manufactured product was also often beset with difficulties and during the midsummer season it was often impossible to obtain sale for the butter. In many cases the butter was packed away and during the autumn season or late in the fall a large portion of the summer make was carted to the city and there bartered away to the more or less fault finding grocer for winter supplies of sugar, coffee and other necessities of life. Of course, with all the disadvantages and draw-

backs there were also encouragements to be found in dairying in that time, chief of which was that the dairyman from May until November need give himself no concern as to where his dairy herd should obtain their feed rations, as grass was abundant everywhere, and there were no limitations as to where the herds should roam, and this fact in itself was sufficient to encourage many a thrifty and far-seeing farmer to give some attention to this feature of the farmer livelihood.

We are sorry to say that at this period, the labor of milking and attending to the milk thereafter until the finished product was turned out was almost wholly accomplished by the women of the household.

The men in most instances being afraid of losing their dignity or from some other unknown causes kept shy of the cow lot, at least did not know how to milk. But as the country advanced in progress from time to time dairying also accepted better methods of work.

Improved breeds of cattle were brought in and as the country filled up with people rude and elementary systems were discarded and with advance of railroads quite a few of the more intelligent class of farmers shipped their butter product direct to the city and received cash for same in a moderately remunerative way.

Having thus in a preliminary sort of way given you a slight but imperfect "sketch of dairying in southern Illinois from almost its first inception, we will now proceed to the days when the creamery business as now practiced was first introduced into our section.

If our memory serves us right in the year 1885 the first creamery in this section of southern Illinois was opened in the neighboring city of Sparta, Randolph County.

Farming as a lucrative business had at this time been on the decline and it was thought advisable to introduce some new form of industry in the hope that the languishing spirit of the farmer might be revived and also that the coffers of the village tradesmen might be more frequently replenished in the increased business which it was hoped would follow.

When the first creamery was opened it was anything but a promising outlook for the projectors of the industry, as it was only after earnest and repeated solicitations that the farmer could be induced to even make the experiment of hauling their milk to town. Many of whom had not more than one-eight gallon can. By and by however, other farmers were induced to make a trial of the new enterprise and in a short time all the farmers in the surrounding community for five or six miles away were hauling milk to the factory.

It might be well to note right here that the creamery building shark never obtained a foothold here, and this may be one reason why the business succeeded from the start as investment was as a rule very limited. The new enterprise was very closely watched by neighboring towns and surrounding communities, and noticing the increased patronage bestowed upon the infant industry, it was only a short time until the creameries began to multiply and in the course of from one to three years every village that made any pretensions to business had their creamery, and in this way soon more creameries were established than could be operated at a profit. However, very few of the many creameries built in this immediate section of Illinois were ever abandoned. Although no doubt a goodly number have a hard struggle for existence. But on the whole the average creamery is perhaps as profitable as other lines of trade.

Coming on down the line we may inquire, has dairying been a profitable investment for the farmer and milk producer. This of course can be answered in two ways, as we all know too well that there are failures in all lines of business. Dairying in Southern Illinois is we claim no exception to this rule. We will admit very many who are making a pretense of dairying are making no headway in the business and can not, while it is conducted, as at present; failures in such instances must be attributed to bad management rather than as a fault of the business.

It has however been our experience and we have made a

close study of the matter for the past ten years, that the farmer who is holding his own in the raising of farm products and who is methodical in his ways and enterprising in all matters pertaining to his business has made some money in dairying and is still doing so. Of course it would be useless to say, or predict, that dairying even though carried on by all the latest and most improved methods would prove to be a "Klondike" to any man. In these days when the margins of profits in all lines are being cut and trimmed so that in many lines of business it is becoming more and more difficult to make ends meet. It is not surprising that dairymen must suffer and do suffer. At the same time there are many dairymen who to our knowledge have paid off debts and even paid off mortgages on their farms, off the product largely of their cows. Paid off on the installment plan through the aid of building and loan associations.

Certainly the farmer finds fault with the creamery man and accuses him of robbing the farmer in many ways, but certain it is if he had no market for his milk he would very soon come to a realization of the fact that to him the loss of a milk market would be a losing business.

It must not for a moment be supposed by the city man or those not acquainted with the details that the cash received every month for the milk is the only source of revenue which the dairyman receives from his cows. There are very many ways by which he makes gains indirectly which largely assists in making his balances appear on the right side of the ledger. Take the milk business, depressed as it is at present, there is not an animal on the farm which to-day can be turned into ready cash on such short notice as the milk cow.

To sell hogs at present prices they will not pay for their feed bills. Horses are almost impossible to sell at anything like remunerative prices. But, the farmer who wishes to sell from one to ten cows any day, all he has to do is to let the fact be known and the buyer immediately puts in an appearance. And this fact must not be lost sight of in making up our estimates.

Another fact which shows how the dairyman stands, the merchants in his town are ready and willing to extend him a

line of credit when wanted, while his neighbor, his equal in all other respects, upon soliciting a favor of similar character is granted the favor, if at all, very reluctantly.

It may be that in some of the older dairying communities the idea or notion has gone forth that Southern Illinois is not adapted to the dairy business, from the fact that its soil is not capable of producing such qualities of grass or that feed suitable for dairying can not be produced profusely here, or perhaps the farmers themselves may not be possessed of the necessary elements of success. If such should be the case we would desire to remove as speedily as possible all such erroneous beliefs.

There are we believe, to this day, those who profess to believe that butter cannot be made in Southern Illinois equal to that in some other older districts, Elgin, for instance. They are entitled to their opinion of course, but it is a fact of which there is no denying that there is a large trade in St. Louis, for Southern Illinois creamery made butter, among the best class of family trade. A trade that will take as its choice the butter made here and shipped in strictly fresh in preference to the best northern and western goods. We think it high time that idea about only certain favored localities being suitable for producing the highest class of butter should be exploded. Of late quite a discussion has arisen in regards to lifting some of the burdens off the farmer by introducing to his notice and use the hand separator, and while this system has some advantages, especially to the large producer, we do not consider it adapted by any means to the average dairyman. This idea about the farmer having to loose so very much valuable time in going to and from the creamery is largely a myth. There is not one farmer out of a dozen who is any distance from a creamery, say two to four miles, but that can club with his neighbor, and need not come with milk oftener than once in four, five or six days, and he necessarily must come or send to town once or twice a week any way. So we cannot see that hand separator would be of any advantage whatever to the dairyman and it would in our opinion be a source of trouble and annoyance to the creamery

man. Now, in conclusion allow me to say that while southern Illinois may have disadvantages in regard to dairying, not found in some other locations, it has some points in its favor also. During our winter season blizzards are unknown and even zero weather is an occurrence of such rare character that it rarely happens more than once in a season, this of itself is a very favorable point. And allow me further, gentlemen of the State Dairy Association, to thank you for bringing your annual gathering into southern Illinois, and it is our hope that the dairymen of southern Illinois may gain great inspiration from this meeting and by the interchange of ideas the dairymen from all over the grand state of Illinois may go home from this meeting and in this new year of 1898 may enter into business with renewed zeal and that we may all find it to be a year of that often promised, but long deferred era, prosperity, of which we have heard so much, but experienced so little.

DISCUSSION.

A Member: Is not the condition of the roads for quite a portion of the year a drawback to dairying in this section of the country?

Mr. Lyons: Occasionally it is, considerable of a drawback, but for several winters past we have experienced very little difficulty in that regard. Sometimes the roads are nearly impassable, once in several years for a few days. We have had no trouble in getting our milk all in.

Mr. Willson: Would not the use of separators on the farm obviate some of the difficulty with the bad roads?

Mr. Lyons: That would be all right for farmers who have twenty cows, but when they have only five or ten cows, it wouldn't help them out. The farmers have got to come to town anyway. The trouble with using separators is that the creameries have got to drive all around and collect the cream.

Mr. Willson: Is the objection from the creamerymen's or the farmer's standpoint?

Mr. Lyons: It would be a great expense collecting this cream. The farmer's expense in hauling the milk is not to be compared with the creameryman's expense, and then a great part of the winter season the farmer's are not busy anyway. The creameryman would have to hire a team at two or three dollars a day, and that is cash paid out.

Mr. Willson: It costs something to hitch up and drive three or four miles through this mud, it comes out of the farmer anyway. How about hauling it in the summer time when the farmers are busy?

Mr. Lyons: A great part of the milk is brought in by children on the farm, young people, girls and old people, that are not very serviceable on the farm, and in this way it is done with very light expense. The farmer must come to town for supplies and he doesn't really lose any time, and many of them don't live more than a mile or two, and where they club together they only have to come in once a week.

Mr. Willson: Would not the value of the skim milk for raising hogs and calves be more if left home fresh on the farm than such as is delivered from the ordinary southern Illinois creamery?

Mr. Lyons: No, I don't think so.

Mr. Boyd: As it looks to me, it is totally impossible for a man to operate fifty machines at the same expense that he can one and that is the foundation of the whole business. If this gentleman has seventy-five or a hundred patrons, that would necessitate seventy-five or a hundred machines instead of one.

Mr. Lyons: I suppose the idea is that the farmer owns his own hand separator.

Mr. Boyd: That don't alter the question. He has got an investment in his machine and he has got to operate it and keep it in condition. In your creamery you operate one or two machines for, say, seventy-five patrons. In the other case there are seventy-five machines to be operated in different parts of the country. Another thing is, that there are not two farmers that will operate machines alike.

Mr. Lyons: And they don't have milk enough to start it up with. I would decide it this way: If I was a farmer and had twenty cows, I would make butter at home.

CREAMERY BUTTER-MAKING.

C. T. MILLER, SPARTA, ILL.

Mr. Chairman, Ladies and Gentlemen:

The subject assigned to me is one that has been written upon many times and a great deal has been said upon it. I do not know as I can add anything to what has been written or said but will give you my views on creamery buttermaking as best I can. I will first describe the buttermaker.

I claim that buttermaking is an art. Everyone could not fill the place in the creamery as buttermaker. Neither could every person make a good doctor, lawyer or farmer. We all have our places to fill, even if it does take some of us some time to find out where we belong.

I think that the buttermaker should be the manager of the creamery, and to fill such a place should have his or her five senses well developed, for if there is any place where they are needed it is in the creamery.

First, The eye should be good, good enough to find all the dirt if any and see everything that is going on. Cleanliness is the first thing; for, if your creamery is dirty, everyone, especially strangers, will notice it and are sure to talk about it in such a way it will advertise and such advertising is not of the right kind.

Second, The sense of smell should be of the very best, so it will catch what the eye does not see. The buttermaker does not want an onion flavor about his cream, neither does he want anything of any kind smelling about the creamery that is not of the right kind.

Third, The hearing should be good, and of a musical kind. How can he tell when his machine is running right if not by the sound? There is music in the hum of the bowl. I do not

consider a man who can not tell by the hum of the bowl when it is running fast enough safe to leave in charge of a creamery to do such work. Of course there are exceptions, but the one who runs a creamery should be able to tell how his machine is running as far as he can hear the sound of it. If his machine is not running up to speed cream and skim milk are going where they should not.

Fourth, The sense of touch. I go a great deal in telling when my butter is worked enough by the feel of it.

Fifth, The sense of tasting. I am afraid this one sense is not used enough in our creameries. This tells us when our cream is ready for churning, and when our butter has that quick nutty flavor that butter should have. If the butter maker has not got a good keen taster how can he tell when his butter is all right? The butter may look all right in every way, but yet lack one of the most essential things that our trade wants and that is flavor.

And this is not all by any means what the butter maker should be. He should be a fireman so as to be able to take care of his engine. He should be a steam pipe fitter, a man of good sound judgment, a man quick to think and quick to act in case of an emergency. He should be tidy, have a place for every thing and every thing in its place. Oil, for instance, should be in its proper place and not on the floor where it is often seen. The butter maker needs to be a good judge of human nature. We have all kinds of people to deal with. Some patrons are very cleanly, while I am sorry to say others, and there are a great many, are not. Now these dirty milk cans must be kept clean and the man who owns them must clean and keep them so. Some people you only need to ask to do so and it is done. Others you have to treat differently and you should know how to get at them.

I had to tell a customer once that if he ever sent his milk in cans in such shape again, the milk would be sent back home. The next day the cans came back nice and clean and have been kept so ever since and he never showed any signs of hard feel-

ings about it either. There is not enough stress brought to bear upon the milk seller by the butter maker with regards to cleanliness. There is no excuse for laziness, neither is there any excuse for carelessness, no excuse whatever. I do not believe in receiving spoiled milk at the creamery and then trying to make gilt edge butter out of it. I think that kind of business is all wrong.

To make good butter we must have good milk, The carpenter cannot make a good building by using old rotten timber, but he can come as near doing so, as we can make first class butter out of spoiled milk.

The milk seller and the creamery must co-operate and, if the buttermaker does as he should there would not be so much off butter on the market and creameries would pay much better. Making butter is not guess work. The maker must know what he is doing and if there is anything wrong he should be able to detect it and straighten it out before it goes too far.

I have tried to tell what I thought the butter maker should be. I might add that he should be a large, stout man for he has a great deal to put up with, especially when the chronic growlers are around. He does not feel right unless they are after him about something.

Now, I think I shall try and tell you how I make butter. I have a weigher. I do not weigh any milk. He is not allowed to receive any milk if sour enough to begin to thicken. Spoiled milk we do not want. He also tends to the tempering vat. The milk in the tempering vat is heated up to 80 or 90 degrees F. before it is run through the machine. This milk is heated by a steam hose put into the milk; some claim this way of heating is not a good way, but I cannot see that it hurts anything if you have good water for boiler purposes, and I think we have the very best of water. The cream runs through a strainer as it comes from the separator and we separate as close as possible. I do not want any skim milk in the cream vat, nor do I want any cream in the skim milk vat. As soon as we are through separating I run the cream into the churn, put on the lids, revolve

a few times, let the gas out and let stand until next morning, when it is ready to churn.

I think the proper place for the cream to ripen is in the churn shut up air tight. This keeps out all foreign flavor that might get into the cream and at the same time keeps the flavor of the cream from getting out. In the morning when I go to churn, should the cream be too cold, I warm up by putting in warm water. I never heat cream up by steam hose; warm water is much better. If in summer time the cream is too warm I cool down with crushed ice. When my churning is done the butter is in great wads not in small granules that so many try to have. Our butter will not granulate because the cream is thick. There is not enough skim milk in it; we quite frequently have to put in water to get it to churn because the cream sticks to the churn and will not let loose. When the churning is done the buttermilk is drawn off and two or three bucketfuls of water dashed in. This is let off, then the churn is filled up with cold water from the well until the butter swims right good; the lids are put on, the churn is revolved a few times, the water is let off, when the butter is ready for salting and working.

I do not take the butter out of the churn only as I salt and work it. Some take it out and put into tubs then empty the tubs on the butter worker while it is in motion, which presses the butter before the salt is spread on. I like to have my butter as loose as possible until it is salted, as the salt gets all through it pretty much before working and it does not take so much working. Great care is taken in the working of the butter. When the butter is worked I roll the butter up into balls or rolls of about twenty or thirty pounds and toss into the tubs very hard so as to make it pack. I never use a butter maul in packing butter. I have seen it used in the tubs until the butter would be worked almost to grease. My style of packing is a little hard on the hoops of the tub as I have often broken the middle hoop, but it makes the butter very solid.

The making of the butter in summer time is done in the cool of the morning, before breakfast. I go to breakfast usually at 6:30 o'clock. My butter is in the cooler while I am at break-

fast. My helper fills up the churn about one third full of water and boils it, then every thing used in the making of the butter is thoroughly cleaned and scalded with boiling water. The churn is well looked after to make sure it is clean. The churn is then emptied, let stand for an hour or so then filled up with cold water from the well and allowed to stand until we are through separating. In summer time I mash up enough ice to cool the cream down to about fifty-six degrees, put into the churn before letting in the cream. By treating the churn this way it is always kept clean and sweet.

DISCUSSION.

Mr. Tyler: At what temperature do you keep your cream in the churn over night?

Mr. Miller: I keep it at fifty-six. The milk is heated up to eighty or ninety degrees before it is run through the separator, but after it is separated, the cream is cooled down to fifty-six or fifty-eight, put in the churn and shut up tight, keep it at that temperature if the temperature of the atmosphere will hold it at that. In summer time it may go to sixty-four during the night

Adjourned to 1:30 P. M.

The convention met at 1:30 P. M. same day.

The president in the chair.

HOME LIFE UPON THE FARM.

BY MRS. MARY A. MAYO, BATTLE CREEK, MICH.

I wish to bring you a few thoughts that will tend to make your home life upon the farm a better life, that you, as fathers and mothers, may be stronger and wiser and better.

In the first place, What is a home? To the roving red man of the West home is wherever he rolls himself in his blanket and lies down to sleep, but to the civilized man, his home must stand as an abiding place, his high tower, his refuge, and it ought to be a place from whence shall go out strong men and strong women, who in turn may bless the world because they have lived in it.

It makes very little difference indeed as to what kind of a structure the home is composed of, but it makes all the difference in the world as to the atmosphere that is inside of the home. It must be a pure, clean, strong atmosphere, developing to his highest every single member of the home. There are some things that it is absolutely necessary must be brought into these homes to make them such as I have described.

What must be the first lesson taught to the children in any home? In all kindness, let me say that the first thing to teach these children in the home is to obey. We all have to obey somebody, no matter who or how we are situated, we have to obey somebody or something, and we do ourselves injustice and our children more if we do not teach them to obey. The boys and girls to-day in the homes scattered all over this country, that know no restraint will be the men and the women that will fill our penitentiaries in the future. I believe children should be taught very early to obey, and obedience is naturally followed by respect and loving veneration for father and mother and the dear grandfather and grandmother. This duty cannot be put upon the teachers. It is too late by the time the girl or boy has reached the schoolroom.

Then I want to say to you fathers and mothers here do not attempt to gain the confidence of your children, but keep it. You know the perfect bond of confidence and sympathy between the little child and its father or mother. Do everything in your power that that confidence may not be broken. In nine cases out of ten, when it is broken it is the parent who has broken it instead of the child. The child comes to the father, the growing boy perhaps, nature is forcing serious questions upon that child's mind and he comes and looks into his father's face

with perfect confidence, and instead of receiving a legitimate answer to a legitimate question, the father says, "Oh, go along, I can't bother with any such questions as that." You do that half a dozen times and your boy won't come to you at all, he will go somewhere else though, and it may not be to the pure, sweet, strong, clean source of father and mother to find out these questions that pertain to his very being. Keep your boy's confidence; mothers, keep your girl's confidence.

I hesitate a little in bringing the next thought to you, but I hope you will take it kindly. I believe that in the farm home and in every home children should be taught honesty. It sounds unpleasant, but I feel that it is needed. Is your word just as faithfully kept between yourself and your child as it is in any business relation? If it is not, you are giving to your child such a lesson as it will never forget. I know of a boy who was once asked as to his father's integrity. For a moment he hesitated and then he says, "Do you mean is my pa true?" Said he, "My pa is as true as God's truth." Fathers and mothers, can your boys and your girls say that of you? They are measuring you every single day. And not only your own boys and girls are measuring you, but your neighbors' boys and girls are measuring you. When I go into any community and ask the average bright boy of ten years to measure to me the men and the women in that community morally, in nine times out of ten he will measure them correctly. Friends, most of us farmer folks won't be able to leave our children a great deal of property, not many broad acres nor much bank stock, but there is one thing every one of us can leave them which is better than either, and that is the legacy of a clean, honest, pure name.

I come to another point, and approach it with a great deal of delicacy, but I think that it needs to be spoken of, and that is the farm home table. Now, I have no doubt there are many of you who will say, "What is wrong about my table?" I do not know of any place in the family, unless it is the family altar, that makes a more lasting impression upon the child's life than the family table, when father and mother and children and perhaps the dear old grandfather and grandmother gather around

one table. I believe that one of the ways to make strong, beautiful characters and to bind those children to the farm home, is to give the greatest care and attention to the spreading of the table. I do not speak particularly about the food, but about the arranging of the tables. I know that in a good many of these farm homes you are using the same old white dishes that you had when you were first married and that you have probably got better ones, or, if you have not, you are able to buy better ones, but you keep your better ones carefully put away until company comes. Now, I don't know of any better company than wife and husband and children, so I say take down the very best you have in the house and use them every single day. Use your silver forks and your pretty dishes and silver, and, oh dear friends, if there is an old grandmother or father in the home, give them the best place at the table, the warmest place in your hearts, and do not let the children any more than yourselves make them feel that they are in the way.

Then, another thing, I was in a farmer's home once and he was boasting to me of the money he had in the bank and while I was there the daughter came to me and begged to coax her father to buy her an organ. She had to ask an almost stranger to go to her father and that brings me to a vital matter in the home, the reading matter. I have listened to a great deal of talk here about the feeding of calves and cows and this is a dairyman's association, and it is all right, you should feed so as get the very best results, but don't forget that your children need mental food, you yourselves need it; it is the child's right in the home to have reading matter and of the right kind. Oh, I know what you will say right straight off, "Can't afford it." I tell you you cannot afford not to do it. Every child should have its paper and its books, those children are going to be fed mentally with something and you must put the right kind of mental food within their reach, and there is no excuse because the very best literature is so very cheap now. There are many ways in which enough money can be saved, the children's candy and ice cream and oranges and some of the father's cigars. Pinch a little somewhere else but have plenty of good reading

matter for the boys and girls in your home, and keep the bad books and papers away from them.

Now, I want to talk a little about farm work. You don't want to hear about that, you hear too much about it? I want to tell you I believe that work is one of the most blessed boons that God ever gave to humanity. You think you are having a hard time. You don't know anything about hard times, the farmers here in these United States of America haven't an idea of what hard times mean. Think what it would be not to have a single stroke of labor to do for weeks and weeks. You go with me into your city of St. Louis or into Chicago, and there are men and women just as good as you and I begging for work and there is no work for them. There is nothing that will rob a man of his manhood so fast as enforced idleness. Suppose your work should be taken away from you and that to-morrow there should be no more chores to do, no milking, no work of any kind. I tell you that you would be perfectly miserable. We ought to be thankful that we have this work and it is the salvation of the family upon the farm that the boy and girl each has work to do, something to keep them busy. I know sometimes we get discouraged and feel that we work pretty hard and get small pay, but isn't that better than no work and no pay? The truth is that there isn't one of you to-day but can set out a meal fit for a king right from your own cellar and pantry and dairy, and yet you are complaining that you are having hard times living upon the farm. There is no one of your children will go bare footed, nor will any of you suffer with cold unless you are too shiftless to get wood. We have enough and to spare, and let us be thankful that we are living upon the farm.

We do not appreciate our farm homes, we do not appreciate each other and we do not appreciate our little children as we ought to. Keep close to your children, don't let them get away from you, they will get away from you of necessity quite soon enough.

Then, pardon me, if I ask you husbands and wives to appreciate each other better. I have felt that we farmers' wives failed to appreciate the devotion, the entire concentration of our

husband's aims and hopes and labor in providing us the home and the home comforts that have been showered upon us. We frequently wait until the dear hands are folded in the coffin and then we say, "Oh, what a wonderful husband I had." Husbands, I am afraid that sometimes you fail to appreciate the perfect devotion of your faithful wives who have stood by you through sunshine and storm. I tell you it is something to stand and meet life and its responsibilities and meet them cheerfully and sweetly as many a devoted wife is doing, and sometimes they fall in the harness, and the physicians say they died of heart failure. I think a great many times they die of heart starvation. There are men in this audience who are wearing the button of the G. A. R., some of them have faced the cannon's mouth, they were brave enough to die for their country. Are you teaching your boys and girls to be brave enough to live for it? Sometimes it takes more courage to live than it does to die. Are you teaching your boys and girls that it must be their part to take up responsibility, to stand in the face of social evils, to stand in the face of the evils of intemperance, to stand clean men and women, giving clean lives to their country and its salvation from evil? It is our work to educate these mortal souls that God has given us along these high lines, train them for the work that is before them.

VARIATIONS IN MILK.

PROF. W. J. FRASER, URBANA, ILL.

(Before reading his paper the professor gave an ocular demonstration of the Babcock test, using two samples of milk, one full milk and the other buttermilk left from the morning's churning.)

Milk has not a fixed composition nor is the amount given at each milking uniform. Both the amount of milk and the proportion of its constituents are influenced by a variety of conditions. Much investigation has been carried on at the different

experiment stations to determine the causes of these variations. Among them may be mentioned individuality, breed, health, food, period of lactation, time and manner of milking, and mental condition of the animal while being milked. So far as butter making is concerned the fat is the important constituent and this constituent is the most variable, the other solids remaining fairly constant.

It is a well known fact that variation is due to breed. Some breeds give a large amount of medium rich milk, while others give less of a better quality. There are both good and poor cows in all breeds and there are greater differences between individuals within each breed than between the breeds themselves. Because a cow gives a large amount of milk it does not necessarily follow that it is of a poor quality, nor if she gives a small amount that it is of a good quality.

As the cow is the basis of the whole dairy business, the first essential is to have a good individual. Much depends upon food, care and milking, but the best of each will not make a cow of 100 pounds capacity yield 300 pounds butter a year. A dairyman may not be able to replace all his poor cows with 300-pound cows at once, but he can surely afford to dispose of those that do not come up to a profitable standard and breed from the others, using a good sire, and thus greatly improve his herd at little expense. What this profitable standard is each must determine for himself, as it varies with the locality, depending upon the cost of feed and labor and the value of the product. If in a given locality it takes a 200-pound cow to pay expenses, a man with a 150-pound cow and a 250-pound cow will just come out even at the end of the year; while if he would sell the poorer one he would have fifty pounds butter clear profit. This is the condition many dairyman are in; they are keeping one-fourth of the herd at an actual loss, eating up the profits of the other three-fourths.

Since the invention of the Babcock test there is no excuse for a dairyman not knowing what his individual cows are doing. Weigh the milk of each cow for a week,

taking a sample of each milking and test this composite sample at the end of the week. The weight of the milk for the week multiplied by the per cent. of fat will give the amount of butter fat given during the week, and if she is giving a good flow of milk it will indicate pretty closely what she is worth for the year.

Considerable experimenting has been done to determine the effect of food upon milk production. The results are often conflicting. This suggests that the element of individuality must play an important part. From the results obtained, however, it is safe to say that foods rich in albuminoids, as oil meal, for example, are favorable to milk production and that succulent foods do not necessarily produce thin milk. A change in the kind or amount of food will quite easily affect the quantity of milk given but if a cow is getting a reasonable amount of food it is hardly possible to increase the per cent. of fat or other solids for any length of time by a change of food.

Dairy cows are quite susceptible to changes of temperature. There seems to be a general tendency for the quantity of milk to decrease and the quality to increase when there is a drop in temperature and when the temperature rises again quantity also rises but the quality decreases.

While the process of milk secretion is a continuous one it is much more rapid during milking. The mental condition of the cow at milking time undoubtedly influences the amount and quality of the milk more than the kind of food given. This is especially true of a nervous cow. Sudden fright, an unfamiliar milker or surroundings and many other causes affecting the mental condition of the animal, may reduce the flow one half for any one day. Any abuse the cow receives is sure to be paid for by a reduction in yield. If cows are driven from the pasture on a run by a dog or unduly excited in any way there will be a shrinkage in the milk. A cow is a very nervous animal and should be treated gently and kindly at all times. If she is not she will be sure to pay for it. A man who can not teach the cow to have no fear of him will never make a good dairyman.

In general rapid milking is conducive to a large flow and

rich milk. When twice the time needed to milk a cow is taken the quantity is not much affected but the amount of butter fat is reduced nearly one eighth. The milk should be withdrawn as rapidly as possible without causing discomfort to the animal. Milking is quite an art. Some milkers get more and richer milk than others from the same cow.

Clean milking is one of the first essentials in keeping up and prolonging the flow. Carelessness in this regard will defeat success no matter how much skill is exercised in other particulars. Not only is an even division of the periods from night to morning desirable but regularity in time of milking from day to day is of great importance. Often a difference of one hour in the time of milking will influence the amount given ten per cent. and if such irregularities are continued in from day to day the flow will soon be reduced.

Milk drawn at different times also varies in composition, although the influence of the time of milking is not the same with all animals; as a general rule the longer the interval between milkings the larger will be the amount of milk given and the poorer the quality, and the shorter the period the smaller the amount and better the quality. This is why it is so often thought that morning's milk is richer than evening's. The cows are milked early in the morning and late at night, thus making the interval before the morning milking much the shorter.

The composition of milk is affected to quite an extent by the period of lactation. The average cow gives milk poorest in fat just after calving. It becomes gradually richer and in two or three weeks is about where it will remain for six or seven months, or whenever the cow shrinks in flow, after which it gradually becomes richer in fat, the other solids increasing but slightly.

DISCUSSION.

A Member: What makes the variation in the per cent of fat?

Prof. Fraser: We all feel better sometimes than we do at

others. If the weather changes from warm to cold, it causes shrinkage in the flow and then the per cent rises. There are a great many things in this connection.

Mr. Monrad: Wouldn't it happen in an individual cow if the boys were in a hurry and don't milk clean?

Prof. Fraser: Yes, or if a cow is milked later at one time than another, the period is longer and the milk would be poorer in fat.

A Member: How much difference is there in changing the feed when you take them out to pasture, or in the fall when you bring them in again?

Prof. Fraser: That is difficult to say except in a general way. Sometimes when the cows are turned out on pasture the test goes down, but the amount of milk necessarily comes up, even if the cows have grain during the winter, and you take it away when you turn them out. They get a change of feed, they like it better, and eat more and assimilate more, and this question depends on what she is going to eat and assimilate, because if she don't assimilate it she don't get it into milk.

The Chairman: What time were those cows milked?

Prof. Fraser: Milking commenced at 4 o'clock in the morning and 3 o'clock in the afternoon, and they are always milked in the same order. One period was thirteen hours and the other was eleven.

A Member: To get the best results, what should be the specific gravity of the acid in this test?

Prof. Fraser: It should be between 1.82 and 1.83; take the commercial sulphuric acid, as usually found, it will run between those two.

A Member: Will a difference in temperature make a difference in the test?

Prof. Fraser: In so far as you do not get a good, clear test, it does; that will happen if you have too high a temperature, or too low a temperature. It ought to be pretty nearly 60, though it can vary twenty degrees without any special difficulty. If your acid happens to be a little strong and your acid and milk

are high in temperature, there will be black particles in the butter fat, so you do not get a clear reading.

A Member: How often do you think a cow ought to be tested in order to give a good idea of what she is worth?

Prof. Fraser: I think the best way is to make a week's test, taking a sample of both morning's and night's milk every time, putting it into a jar and then taking this composite sample at the end of the week. It depends on how close he wants to know what his cows are doing and also upon how much the cows are varying. Take the first month after the cow calves, you cannot tell so much by her test, she is liable to be up and down more. Some cows' very first milk will test high. We had a cow come in about five days ago, and she tested nearly five per cent. She usually runs about three or four. That is exceptionally high. For the first month they will usually be low, so that if you are only going to make one or two tests, it will be better to wait until a month or two along in the period of lactation and then take a week's test. Then I do not think it is necessary to test again until they are changed considerably in the flow, when they run down again. Two or three times during the period of lactation will give you a very good idea of what the cow is doing, tests taken for a week.

A Member: What chemical do you use in taking the composite test?

Prof. Fraser. Potassium of bichromate. You can get it at any drug store, but that is a rank poison and you want to be careful. All preservatives are poison. The reason that it is recommended is because it colors the milk, makes it a decided yellow and there isn't so much danger of accidents. If you want to get at what your cow is doing, take morning's and night's milk together and test them for one day.

A Member: Can cows be fed so that milk gets richer?

Prof. Fraser: No, not to a very great extent, if the cow is already getting a fairly good amount of good nutritious feed. Of course if she is sparingly fed it might be changed, but the amount of fat in the milk, that is, the per cent. of fat, it is pretty hard to change by feed.

Mr. Miller: If your acid should be weak can you remedy that by putting in a little more?

Prof. Fraser: Yes, if it is a little weak, you will not get all of the caseine that is in the milk dissolved, which is the object sought, so that the fat can come to the top more readily. By using a little more acid you will have the same result as if the acid was stronger.

Mr. Phillips: How will you get a fair test from the weigh can at the creamery?

Prof. Fraser: If the milk is poured in from one can after the other, you get a pretty good stirring there, so that ordinarily that ought to be sufficient, you will get a pretty good test from a sample from that can.

Mr. Lyons: You spoke of pouring in order to mix milk before taking your sample. Will thorough agitation do as well?

Prof. Fraser: It will, if you get it, but the easiest way to get thorough agitation is by pouring. Of course, in the creamery if you did any more than pour it in, you would have to agitate it by the dipper or something.

Mr. Adams: In an every-other day system of creameries can we get a good sample?

Prof. Fraser: Why, yes, so long as the milk is not sour.

Mr. Holfson: Does the kind of water you use have anything to do with the test as to being hard or soft water?

Prof. Fraser: It hasn't anything to do with the fat in there, but it has in keeping the bottles clean. If there is lime in the water it will collect on the bottles. Distilled water is the best.

Mr. Spicer: Sometimes in taking a test there is lots of cream comes up very quickly on top.

Prof. Fraser: That is where the cream gets so dry and hard that it does not dissolve readily. In that case you would not get a clear sample without more agitation.

The chair appointed the following committees:

On Nominations: R. G. Welford, John Stewart and H. H. Hopkins.

On Resolutions: A. G. Judd, L. A. Spies and R. G. Spicer.



PROF. J. B. WEEMS.

MILK PRESERVATIVES.

BY PROF. J. B. WEEMS, AMES, IOWA.

Mr. Chairman, Ladies and Gentlemen:

The subject of milk preservatives is an important one to those engaged in the production of dairy products. Questions relating to this subject are asked by almost everyone, and I will endeavor to present the subject so that it may be of interest to those who are connected with the dairy industry. We find upon the market many brands of preservatives, which are sold for the purpose of preserving milk, butter and cheese; and we may divide them into two classes: 1st, those for preserving dairy products intended for food, and 2d, those for preserving composite samples in the creamery.

The substances that are used for preservatives are boric acid, borax, salicylic acid, salt, formaldehyde, etc. These are found in those preservatives intended for use in foods. The substances largely used for the composite samples are corrosive sublimate, formaldehyde, and potassium dichromate.

Boric acid has been used as a preservative for many years, largely for milk and butter. Many of the preservatives sold in packages under certain brands contain this substance. Borax, which is a sodium salt of boric acid, is also largely used. Common salt is found in many of the preservatives in connection with borax and boric acid. One brand which is on the market contains 75 per cent of boric acid and 25 per cent of borax. Another is composed of two-thirds of borax and one-third common salt. The first is intended for preserving milk, cream and butter; and the second for butter and cheese. As boric acid can be purchased for 15 cents per pound, and borax for ten cents at any drug store, we must conclude that there is quite a profit in this business when these

packages containing about one pound each are sold for thirty-five and thirty cents respectively.

Boric acid is used at the present time largely by some milk dealers who furnish milk and cream to city customers. For illustration I may call attention to some results taken from the last report of the Ohio Dairy and Food Commissioner. Of the four samples of cream suspected of adulteration, three contained from 0.20 to 0.23 per cent. of boric acid. It must not be taken for granted that this means that three of every four samples of cream contain boric acid, but only that of the four samples suspected of being adulterated by the Ohio Commissioner, three were found to contain boric acid, as stated. The same report contains results of the analyses of samples of milk which were found to have about the same quantity of boric acid as the samples of cream.

Salicylic acid is almost entirely used for the preservation of foods other than dairy products. For the purpose of preserving composite samples it is of little or no value. The copper and mercury salts of salicylic acid, however, are probably equal to corrosive sublimate and potassium dichromate as preservatives. The ammonium, potassium, sodium, and zinc salts of this acid have about the same value as the acid. The salts of salicylic acid are more expensive than those that are in common use and therefore are not liable to come into general use for the composite samples.

Formaldehyde, which was introduced some years ago, is, I believe, becoming more generally used as a preservative, not only for dairy products but generally as a preservative. The substance is one which is widely distributed throughout nature. It is found in the leaves of plants, where it may be said to be formed from water and the carbon dioxide of the air, and from which the plant produces sugar. Formaldehyde is readily manufactured from wood alcohol, and in its pure condition is a gas. To produce this gas all that is necessary is to burn wood alcohol, where there is a limited supply of oxygen or air. This result may be produced by burning the alcohol in a lamp made for this purpose, or the vapor of the alcohol mixed with air is

caused to pass through a hot copper netting and by suitable connections caused to bubble through water until the water has taken up or absorbed as much of the gas as it has the capacity to hold. Water at ordinary temperature will absorb about 40 per cent. of the gas, and this product is known commercially as formaldehyde 40 per cent. Most of the brands of preservatives which contain formaldehyde are not made of the 40 per cent. solution but contain a much smaller quantity of the pure substance. In England there is used a five per cent. solution of formaldehyde which is called "formaline", and this is used largely for preserving the milk supply of city milk dealers. For a period of eighteen months there were used over 15,000 gallons of formaline in that country.

One brand of preservative found in the state of Iowa contained five to six per cent. of formaldehyde, and was sold for a short time at \$2.00 per gallon. In Chicago we have found that a firm has been using formaldehyde but they have sold it under another name. At first this firm used a sandy material colored red to absorb the formaldehyde solution, but lately they have been placing it on the market in liquid form. These packages hold about one pint of material and are sold for \$1.25 per package. Formaldehyde is quoted at the present time at 45 to 50 cents per pound, and a comparison proves that it is better to purchase the formaldehyde as such and not under another brand or name. There is a feature in connection with the use of formaldehyde which is of interest to those using a preservative, and that is the fact that those who have investigated the subject claim that it is a non-poisonous body. Dr. Berloiz states that it is perfectly harmless to man, and Dr. Rideal, an English investigator, makes the statement that he has frequently drunk a one per cent. solution of formaldehyde without any ill effects. Other investigators claim that large quantities of the substance act as a poison, but it is admitted by Blythe, in his work on foods, that it would require seventeen grams of formaldehyde at a single dose to produce any effect upon a man. The question whether the substance would produce bad effects by constant use of food preserved with it is an unsettled one, but I think that the results

of experiments made with it indicate that it is unwise to use it.

In using a preservative for composite samples there is more or less danger from accidental cases of poisoning, and in the selection of a preservative the less the danger from this cause the better. The preservative powers of formaldehyde are equal to those of corrosive sublimate and potassium dichromate. The following taken from the results of an investigation in milk preservatives and published in a bulletin (No. 32) of the Iowa Experiment Station will give a comparison which will represent the results of the investigation. The Mason fruit jars held one pint of milk and the preservatives in the quantities as given below were placed in each jar, then each day there was added to each jar fifteen c. c. of milk to represent the composite sample as taken in the creamery, the jars being shaken each day to ensure the milk being mixed thoroughly.

		Quantity in each jar.		Time preserved.
Formaldehyde,	40 per cent.	.1 c. c.		13 days
"	40 " "	.2 c. c.		17 "
"	40 " "	.4 c. c.		22 "
"	40 " "	.6 c. c.		33 "
"	40 " "	.8 c. c.		39 "
"	40 " "	1 c. c.		46 "
Corrosive sublimate,		$\frac{1}{4}$ gram		21 "
"	"	$\frac{1}{2}$ "		30 "
"	"	1 "		48 "
Potassium dichromate,		$\frac{2}{3}$ "		24 "
"	"	1 "		33 "
"	"	$1\frac{1}{3}$ "		47 "

The above results show the preservative power of the substances used compared one with the other. This experiment was made during July, August, and September. The mean temperature of the room was 76.7 F., with a minimum temperature of 65 F., and a maximum temperature of 87 F., which was as severe a test as could be made upon them.

There has been recently published an investigation of a milk preservative sold in England, called "Rhodin Purifier," for which

it was claimed by the manufacturers that a teaspoonful of it when added to a pint of milk "will neutralize all disease germs, bacteria, microbes, bacilli, and other impurities." The investigator found that it was a solution containing nineteen per cent. of potassium nitrate, or saltpetre, dissolved in water. Instead of being a neutralizer of germs, etc., there were many kinds of germs, bacteria, swarming in it, and on the whole a substance which would contaminate the milk and not preserve it.

The chromates of potassium are used as milk preservatives. Two of these compounds are potassium chromate and potassium dichromate. The difference between the two compounds may be briefly stated is that the first contains twice as much potassium as the second. The potassium chromate has been used for the preservation of milk by some dealers of some cities of Europe who use certain yellow powders consisting of potassium chromate and potassium dichromate. The milk on examination was found to contain these powders to the extent of five grams per quart. Such action on part of the milk dealer would indicate very great ignorance or little interest in the welfare of his customers. Corrosive sublimate is more generally used I believe than any of the preservatives for composite samples. One of the greatest objections against it is that it is a powerful poison and many realize this danger. It is, however, one of the best preservatives for composite samples that we have. When manufactured in the form of tablets it is a very convenient preservative in the creamery.

In conclusion I would call attention to the use of preservatives in food, and especially dairy products, which there is a tendency on the part of some to use. It is wrong I think to make use of any preservative in any article intended for food. The customer has a right to receive the food purchased by him in a pure condition.

As to the choice of a preservative for composite samples there are three of about equal value for this purpose: corrosive sublimate, formaldehyde, and potassium dichromate, and I would recommend that you select either of these best suited for your purpose and purchase it according to its name, and not

under a brand which will mislead you and at the same time cost you much more to purchase.

DISCUSSION.

A Member: Do you know what they call on the Pacific Coast boraxine?

Prof. Weems: Boraxine has been used, I think, as a preservative for general purposes, and its composition is similar to many others on the market containing boric acid.

Mr. Spicer: Is it to be understood that all preservatives retard digestion in the human stomach?

Prof. Weems: Some experiments appear to indicate that there are some preservatives which have little or no effect on the digestive processes, but we know practically nothing of the results of the continued use of small quantities of such substances. The substances which retard fermentation will also retard the digestive processes, is, I think, the conclusion of anyone who investigates the subject.

THE ALKALI TEST FOR THE DETERMINATION OF LACTIC ACID IN CREAM AND MILK.

There is a method which has been introduced in the creamery within recent years call the "alkali test." This method is used for the purpose of determining the amount of lactic acid present in milk or cream. There is present in milk and cream a substance known as milk sugar, which when acted upon by the lactic ferment is changed to lactic acid. During these changes there is produced certain products which give a high flavor to the butter, and the amount of lactic acid within certain limits appears to govern the flavor. One of the problems in connection with the production of butter flavor is the investigation of the amount of acid present in the cream when the best flavored butter is produced. One of the substances which is used in the

process of determining the acid is called an indicator. I have here a solution of this indicator which is called phenolphthalein. On adding a few drops of it to the water in the glass it does change the color of the water. I have here a solution of caustic potash, and on adding a few drops to the contents of the glass changes it to a pink color. If we add a few drops of an acid the pink color disappears and the solution becomes colorless. We find that an indicator is a substance which shows by the color of the solution whether an acid or an alkali is present. (The professor explained the different parts of the process and the different chemicals used therein; also a description of the Farrington tablets and their uses.)

DISCUSSION.

Mr. Newman: In the Iowa school do you determine the acidity of the cream that is churned every time?

Prof. Weems: Yes. There is more or less trouble for a beginner to become accustomed to the method and with the terms used, which are of a chemical nature, but I think a little practice is all that is necessary.

Mr. Newman: About what percentage do you say is the best?

Prof. Weems: Our creamery at the college finds that 36-38 c. c. of a deci-normal solution of caustic potash for 50 c. c. of cream gives the best results. This result is about .65-.68 per cent. of lactic acid. Prof. Farrington considers that .6 as giving the most favorable conditions for the production of butter with fine flavor.

Mr. Pethebridge: Don't you think that it would be a much simpler way to give the acidity in degrees, rather than in centimeters by means of the burette in exactly the same way?

Prof. Weems: Naturally the simpler the better, but the term cubiccentimeters is one which is used at present very generally in creamery work. I think that the buttermaker should have a knowledge of such terms in order that he may understand the process thoroughly.

A Member: Would two samples of cream having the same amount of acid in them by this test taste the same?

Prof. Weems: I do not think it would be well to depend upon taste as a means to determine the amount of acid in any sample of cream or milk.

Mr. Lyons: Since you adopted this method of testing your cream, do you find a difference in your butter product?

Prof. Weems: I think so, for it gives the buttermaker control over the process of ripening of the cream, and he knows when the cream is in condition for churning.

Mr. Lyons: But does he get a better grade of butter, or more of it?

Prof. Weems: The process gives the buttermaker control of his cream, and naturally he can obtain a uniform product having the best flavor. As the cream is well ripened the loss of butter fat in the buttermilk is a minimum quantity.

CHEAPEST MILK PRODUCTION, OR HOW TO MAKE BUTTER AT A FOOD COST OF EIGHT CENTS PER POUND.

A. G. JUDD, DIXON, ILL.

Mr. Chairman, Ladies and Gentlemen:

Doubtless you all realize by this time that the best results received from these meetings come from the freedom with which you ask questions, and determine how far you can apply the principles promulgated by the speaker to your own individual business.

It must also be remembered constantly that methods adapted to a black loam soil will not produce similar results upon a heavy clay soil; neither will the methods that I shall state, as applied by me with my surroundings, produce similar results for you, if your surroundings are radically different.

If my talk is to be of practical benefit to you, do not expect highest results from moderate conditions, but be willing to improve conditions until highest results are reached.

We have not time to go back and follow the history of the cow down to the present day, or the characteristics of the different breeds. The dairy cow is a cow, bred, fed and handled for the single purpose of producing milk, the quantity and quality of said milk determining the value of the cow and the amount of profit her owner shall receive.

As the quality is determined by inheritance, it remains for the owner to apply his skill in developing the quantity and preserving the quality. By that, I mean, if a cow is born with the ability to produce 5 or 6 per cent. milk, no foods or system of feeding can materially increase that per cent. of butter fat.

But, it is very easy to feed so as to reduce that per cent. of fat; hence the necessity of the dairyman's learning at the outset that nothing but a well balanced food ration, and careful handling under favorable conditions will enable any dairy cow to do her best.

Now, let us for a moment, study the outlines of a dairy cow. She should possess a long, thin head, large nostrils for plenty of air, great breadth between the eyes, high forehead, a bright, clear eye, sound teeth, thin neck, deep through the chest, with large lung capacity, long, large backbone for plenty of nerve force, broad hips, high pelvic arch, thin thighs well apart, giving plenty of room for a good udder. She should be deep through the flanks, with plenty of store-room for food; the udder should be well developed, running well up behind and well forward on the body, with large milk veins, teats set evenly on the four quarters, and of good size. A cow with these points well developed indicates that she is descended from a line of dairy cows, and will rarely prove a failure if properly handled from birth up.

I find that we can improve the ordinary cow of the present day, which has been bred chiefly to producing short horn beef, by using a thorough bred Holstein sire. No other breed seems to possess the ability so strongly, to transmit the dairy form, and the capacity to produce a large quantity of milk.

The off-spring retains a good quality of milk, is easy to keep in good flesh, is of large size, and comes wonderfully near making a good "general purpose cow," that can distance the

"special purpose cow," of many thorough bred herds, no matter for what product you use the milk.

Thus the young man can buy a few cows from those around him, secure a good sire, and in a few years build up a valuable herd.

Having secured a herd by careful selection and systematic breeding, we will proceed to the ways and means of maintaining it.

We must raise our best heifer calves. The first six months' or year's care of the calf determines largely the future usefulness of the cow. Here we can develop the tendency to take on fat and ruin the milking qualities.

It is a very easy and cheap matter to raise calves if you know how. Here is my way: Remove the calf from the mother when it is from one to three days old, according to the disposition of the cow. If it is the first calf, I prefer to remove the first day, to prevent, if possible, the inclination of the mother to hold up her milk, which is liable to induce a bad habit.

When the calf is removed, feed it for three or four days with the mother's milk, twice a day; then drop out a pint of milk, add a pint of warm water and a teaspoonful of oil cake meal. In a couple of days drop out another pint of milk, and add another pint of warm water and a handful of low grade flour, (costing \$1.00 per 140 pounds) and so on, reducing the milk every two days, until at ten or twelve days you have taken away all the new milk and substituted oil-cake meal, one tablespoonful, warm water, four quarts, and flour, two handfuls. Put whole oats, corn and hay where it can get them when first removed from the cow. Do not take away all the new milk until it is eating freely of the grain. Put boiling water on the oil-meal and flour; temper with cold water or skim milk.

Try to have the heifer fresh as near two years old as possible and do not allow her at any time to take on fat. A hearty, growing condition is what we want, and any time you see her plumping up and rounding out, shut off feed somewhere. Angles are what we want, and while it will not make a picture the most beautiful to look at, the credit side of her milk account will grow

amazingly later on, and you will have developed a cow that dairymen will want.

Do not discard a young cow if she does not meet your expectations the first year, but give her another trial. Frequently she will double the amount of milk the second year, but if the second season is not satisfactory, sell her to the butcher.

Having told you how to breed a dairy cow cheaply, and how to raise a calf without a dollar's worth of milk, I will now tell you the ordinary way of feeding cows, its cost, and how to reduce not only the cost of the feed nearly one half, but the labor one half also, and do away with all machinery.

It is customary with many to feed a milk cow clear cornmeal and hay, and for a little time she may appear to be doing well, but some morning you find that the milk has fallen off wonderfully, and probably some of it is ropy, one quarter of the udder is hard, and she does not care for any breakfast. Now you are in for a backset sure. It is the certain result of an unbalanced, concentrated ration. The system is full of fever. The Babcock milk test will show that the butter fat is almost entirely burnt out of the milk.

Right here I want to say that even with the most judicious feeding, the butterfat in milk is more sensitive to changes than any organ of the body. The wonderful variations in the quality of the milk from day to day cannot be satisfactorily explained by any one, and is one of the few unsolved problems that have attracted the attention of dairy scientists. You may keep the cow from day to day under exactly the same conditions as nearly as possible, temperature not allowed to vary a single degree, food and water weighed and exact amounts given each day, and yet the butter fat test will show variations that look about like the notes on a bar of music.

I have known men to get a contract to sell their milk at the condensing factory, go to the cow sales, buy everything that had a calf by its side, whether it belonged there or not, pay high prices, take them home and feed to each cow an eight-quart pan full of clear corn meal at each feed. In the course of a few months, we find the same men cursing the whole business, and

complaining that there is no money in cows anyway. Of course not. The man was wrong, the selection was wrong. The breeding has been wrong; the feeding was wrong. The only correct thing is the result, a burned up, dried up, beefy cow.

Many dairy writers say that a cow is a machine, and returns you a profit only after she has appropriated enough food daily for her own support. Well, that is not my idea of a dairy cow. A true dairy cow will return to you a certain proportion of milk if you feed a milk ration. So the point is, to combine the foods in a proper manner to contain the standard amount of protein carbohydrates and fat. Then feed all the cow will safely consume, but see that she eats it up clean and is greedy for the next meal. Corn, oats and bran each one third by weight make an ideal standard ration if you desire to feed ground grain.

Now the question of profit is affected greatly by the manner in which we make this food combination.

The usual way is to plant corn three or four kernels in a hill, husk it in the fall, put it in the crib. Sow the oats, thresh them and put in the granary.

Feeding time comes on. You go to the crib and fill the wagon box with corn, fill a number of sacks with oats and take the load to the nearest grist mill, which is anywhere from one to five miles. Probably you must wait an hour or more for your turn to unload, and possibly by waiting another hour or two you may get your grist, or you may have to go home without it and return the next day. You pay Mr. Miller \$1.25 per ton, leave your cobs and take your chances on a hundred pounds shrinkage. Thus it goes for a few years; then you make a heroic resolve to buy a mill and power of your own, and do this grinding yourself. Very well, that is a long step in the right direction.

You buy a mill that costs seventy-five dollars and a power costing as much more, and you think that you have solved the problem. But alas, the cold, stormy weather of winter soon presents the disagreeable features of that system; for if you have ever dug a power out of a snow bank, thawed out the oil can with a fire from a bunch of hay, and endured a stiff north easter

for three or four hours, while keeping up motion, you then realized that even this way had some draw backs also. You see I have been through the whole business, and know whereof I speak; for I fed a dairy of fifty cows in just that way for several years, and probably should be doing so yet, had it not been that so many factories came into Dixon, and took my hired help away, not even leaving a boy to drive the horses on the power.

So, out of sheer necessity, I got my "thinker" to work, and discovered that cows had a grinding mill, power and sheller all their very own, and I commenced to shove in ear corn. By a little further investigation I discovered that they had a husking attachment also, and I put in snapped corn! Well, that tickled me so that I kept on investigating until I found a whole shredding machine, without any patent on it, and capable of doing vast amounts of work without repairs and I rolled in the corn and stalk, both together, and results were very satisfactory.

But I still had to grind the oats and that did not quite suit me. So I experimented and investigated until one day I discovered—what do you think?—a whole threshing machine, self-feeder, stacker, and all. So now, I just drop down the sheaf oats in front of the self-feeder, it picks them up, and "presto, change—milk!

I immediately set to work to study the matter closely and decided that, by proper previous arrangements, I had discovered the means that would enable me to reduce the cost of feed and labor at least one-half, do away with all machinery, save toll, produce a larger milk yield, enable me to meet the constantly decreasing prices of farm and dairy products, besides increasing the income of the farm one-third, by selling all the hay formerly fed to the cows.

My present method is to plant an acre with corn for each cow, putting as nearly as possible six kernels in a hill, thus getting nearly double the fodder on one acre. The ears are not so large, and hence more easily eaten by the cow; the stalks are not so large around and have more leaves, thus making the fodder very nutritious and relishable.

Cut the corn-fodder as soon as the ear is mature enough to

keep in the crib. The bottom leaves are beginning to turn brown then. Now hustle the cutting! Put in large shocks so as to have as little exposed to the weather as possible. Draw the tops tight and tie with binder twine.

When ready to crib, husk out five or six average shocks and find how many bushels of corn they yield. Calculate to leave twenty-five bushels to the acre; husk out the balance by working around the shock, without untying any of it. Thus you disturb the shock very little, and your husking is done about as soon as your neighbors.

It is necessary to have a small yard well protected by buildings, sheds, and high, tight fences to shield the cattle from the cold winds. With warm water to drink, and corn fodder in racks to pick at, the mercury may stand at *zero* or below, and you will not see a humped up or shivering cow in the bunch, if turned out regularly from four to six hours every pleasant day.

Build frames or racks to feed in, by taking five plank two by twelve by sixteen. Put *two* planks on a side, and the other plank makes *four* pieces for the two ends. Put old posts in the corners to nail to, a fence board in the center to prevent the sides from springing apart, and you have a bottomless rack that you can take hold of and turn over, whenever it needs cleaning of refuse, thus saving much time and annoyance in cleaning out the old way where stationary racks are used.

Get a couple of low wheels about sixteen inches in diameter, have a couple of old wagon stubs fitted to them, attach to a good, strong, wood axle; take two 4x4x16; lay across the axle a little behind the center, bolt solid. Bolt a cross piece at each end; put a couple of fence boards on lengthwise to fill the middle. Spike on front ends a couple of 2x6's about two feet long for runners. Attach doubletrees to the front end with a short chain, and in a couple of hours on a stormy day you have rigged up a truck upon which you can carry fodder enough for fifty cows and one man can go to the field, load, and fill racks in three fourths of an hour. Three such racks will hold enough for fifty head. Whenever I have time, I fill my barn with fodder to use on stormy days and in the spring.

After milking in the morning, I feed bran. After breakfast feed sheaf oats; these are eaten while the man is filling the racks with corn fodder. If the oat straw is free from rust and cured in good condition, the cows will eat it as greedily as hay, and you will find that the oats are thoroughly digested.

Allow one half acre of oats for each cow. Cut when the grain is turning and about two thirds ripe. Be sure the berry is ripe enough to fully mature in the shock, for we want the full benefit of mature oats. Bind in bundles, the same as usual; put in shocks, and as soon as safe move into the barn.

After the oats are eaten up, turn out the cows, clean the stables, fill the mangers with fodder corn for the night. After milking at night, feed bran again.

By having shoats to follow the cattle there is no waste whatever. You have saved in a dairy of fifty cows, for grinding, at least, \$125.00. You will sell \$300.00 worth of hogs, five to seven hundred dollars worth of hay. One man can do the work of caring for the fifty cows and thirty shoats and ten calves. Your corn fodder will not cost you to exceed \$1.50 per ton. You have saved in the cost of the feed, well, let us see.

A BALANCED RATION.

8 lbs. bran, 5 lbs. oats, 26 lbs. corn fodder.

	P.	C.H.	F		
8 lbs. bran,	1.	3.52	.24	@ \$9.00	\$.036
5 lbs. oats,	.37	1.80	.17	@ .18	.027
26 lbs. c. fodder,	.70	7.38	.25	@ 1.60	.02
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
39 lbs.	2.07	12.70	.66		.083

Comparison of cost of two ways of feeding. Each system containing 1-3 corn, oats and bran by weight.

FIRST WAY OF FEEDING.

			g.	h.	
Corn 60 lbs.	@	20c.	4	1	25c
Oats 60 lbs.	@	18c.	34	4	39c
Bran 60 lbs.	@	\$9.00			27c

180 lbs.	Cost	91c
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180 \div 10 lbs. 18 cows—grain cost 91c.

20 lbs. hay + 18 cows = 360 lbs. @ \$7.00 = \$1.26

\$2.17 \div 18 = 12c per day.

SECOND WAY OF FEEDING.

			h.	g.	h'
Corn 80 lbs, cob and husk,	20c		3	4	1 = .12
			T.	g.	h'
Oats 80 lbs, grain and straw, 2 bu @ 18c	36c	3	4		1 = .28
Bran 80 lbs, @ \$9.00					= .36

240 lbs.	cost.	.76
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240 \div 10 = 24 cows.

\$.76 \div 24 = .036 grain cost.

Corn stover .02

\$.056 total cost each cow.

Add 1-3 more corn
and oats to it .032

.08 grand total per day.

P.—Protein.

CH.—Carbohydrates.

F.—Fat.

h.—husking.

h'—hauling.

g.—grinding.

T.—threshing.

DISCUSSION.

Mr. Adams: How do you feed your bran, wet or dry?

Mr. Judd: Dry always.

Mr. Worth: How do you feed your corn?

Mr. Judd: I feed it in the shock. I told you I left twenty-five bushels in the shock, husking out the balance, then I haul the shock right into these racks. I feed the corn whole, do not grind anything. She takes it right out of the way herself, husk and all, and I want to say to you right here that you never can improve the quality of corn by anything you can do with it. The husk preserves the most nutritious elements. I can take that corn in March and April and break it open and it is as crisp and nice as can be, but you husk it in the fall and it is dried out when you come to feed it.

A Member: Isn't it difficult for a cow to eat that corn?

Mr. Judd: No, sir; but do not go home and start this thing now. Wait till next fall, make your arrangements beforehand and start in season and go right through and you will have good results.

Mr. Willson: How long have you practiced this and do you feed this corn fodder out of doors or under a shed?

Mr. Judd: The racks stand right under the leaway of a shed. I have a shed built on two sides of my yard and these racks stand right under a short part of that shed. I turn them over back and forth. I have fed this way for four years.

Mr. Boyd: Do you feed the cows out of doors all winter?

Mr. Judd: Yes, sir; they are stabled every night.

Mr. Black: Do you use stanchions or do you tie up?

Mr. Judd: I use stanchions.

Mr. Boyd: Do you find that the cows digest all the corn?

Mr. Judd: No, but the shoats follow them and it is saved.

Mr. Boyd: Then a good deal of the corn runs through the cow whole?

Mr. Stewart: What breed do you have?

Mr. Judd: Grade Holsteins.

Mr. Stewart: Dehorned?

Mr. Judd: Yes, sir.

Mr. Willson: What advantage do you claim for feeding the bran dry?

Mr. Judd: It saves lots of time and labor in putting the water on. I put the bran right in the mangers in the barn and they eat it there.

Mr. Boyd: Do you figure this one pound of butter a day all the year around?

Mr. Judd: No, sir; that would make 365 pounds of butter a year and we don't do that.

A Member: How about when she is dry?

Mr. Judd: All my dry cows get two quarts of bran a day and sheaf oats, the same as the others do.

A Member: I understood you to say that ration cost eight cents a day and produced one pound a day.

Mr. Judd: If she produced two pounds it is only half that.

A Member: How about all the time she is dry, don't you charge that up to the butter?

Mr. Judd: I told you I figured 180 days at 12 cents and 5 cents on pasture. I figured on an average of 286 pounds and that made the cost 8 cents. If she is producing less than 286, it is costing you more than 8 cents a pound.

A Member: How do you cut your oats?

Mr. Judd: With a binder and shocked them up, but I cut the corn when it is about two-thirds ripe and the stalks a little green. You don't want too well matured.

Mr. Stewart: What proportion of your oat straw is left after feeding?

Mr. Judd: There is very little left. You would be surprised to see how little. My corn fodder is going to run a little short, so I have been feeding a little hay at night and putting these sheaf oats on top of it and they will leave that nice, clean, bright hay, half clover and half timothy, and take those oats, including the straw.

Mr. Dennis: How do you keep your oats so the mice won't eat them?

Mr. Judd: I pack them in the barn, stack them, heads in,

and then we keep cats around the barn, they are the best friends we have.

Mr. Willson: I think the gentleman is on the right track. Have you had experience feeding cattle on ground feed and ensilage?

Mr. Judd: I have used ground grain, yes, and oil meal and bran, and I can beat the quality of the milk with this system and keep up a better flow for the year. The idea of this is that you cannot knock the cows out as you do with ground feed. After your cows get accustomed to it, you can't feed them any other way. I have run out a week or two in spring before the grass came and my cows will go right off.

Mr. Newman: What is the effect of giving cows warm water to drink?

Mr. Judd: It keeps the inside of the system warm. If you give them cold water it chills the system inside. You turn a cow out every day and she grows a nice, long, thick coat of hair. I have been out when the thermometer was 15 below zero and they would not fall off a pound in their milk and stand out there from about nine o'clock in the morning until four o'clock in the afternoon.

A Member: Do you give them that water in the barn?

Mr. Judd: No, it is in the tank in the yard; it is about 50 degrees.

A Member: How much increase of milk did you have when you started to use the warm water?

Mr. Judd: You can increase the amount most any time by taking off the ice. Your cattle will drop off when your tank freezes up, but you will see a sudden increase when you give them warm water.

The Chairman: Won't the cows vary if the weather changes?

Mr. Judd: No, sir; that sounds unreasonable, but I tell you where a cow is accustomed to changes, she won't fall off, but she will fall off if she goes into the barn every day.

Mr. Boyd: Do I understand that your cows are fed all their food out of doors?

Mr. Judd: No, sir. I feed the corn fodder out doors. In the morning and in the afternoon this winter I have fed entirely out of doors.

Mr. Boyd: Suppose it is very bleak, snowy.

Mr. Judd: They will get their corn ration out doors while we are cleaning the stables; then we feed them the rest in the barn every day.

Mr. Boyd: Do you weigh your milk every day?

Mr. Judd: Yes, I have a ticket for my milk every day.

Mr. Boyd: Do you not keep a record of the individual cow?

Mr. Judd: No, sir.

Mr. Boyd: Do you find when feeding sheaf oats that way that they digest them all?

Mr. Judd: I haven't seen any whole oats. They will go through them if they pick out the oats alone, but if they have to take up the straw too, they won't go through them. I started without knowing anything about this business and it has just convinced me. I went to work at first and fed ground grain and kept my cows right in the barn all the time, except to drink and get the stables cleaned out, would not let them out more than fifteen minutes, but I tell you I ruined thousands of dollars worth of cows following up that system five or six years, but I made money at it because I sold them for beef.

Mr. Stewart: You say to cut your oats green?

Mr. Judd: No, I don't say anything of the kind, I say not fully matured. I cut my oats with a binder and bind them up and I am satisfied that they will keep. I am very careful about that. I go out there every day when it is getting time to cut them and see what condition they are in. When I make up my mind that they are ready to cut, I go in and cut as quick as I can.

Mr. Willson: Do you say that you get a better grade of milk, richer in butter fat by this method?

Mr. Judd: I don't calculate that you would get any higher test, but you can keep it more regular. With ground grain she will get fever in her system and burn out the fat, but if you feed by this system, they don't get any fever, and they will average more even through the month and the year.

A Member: Your idea is that you can't get the cow to give any richer milk no matter how you feed her?

Mr. Judd: If she don't give more than 3 per cent. milk you can't get any more.

A Member: How do you account for the fact that I have raised the per cent. of fat?

Mr. Judd: You have got them into better health by feeding.

Question: Will that account for the milk being richer in butter fat?

Mr. Judd: Yes, it will every time. You have fed health into your dairy by adopting this system. There is a gentleman sitting over there who has followed my process, and I would like to have him stand right up and tell what he thinks of it. I received a letter from him last spring in which he said, "I have followed your system this winter and my neighbors have followed it with me, and where we owned grinding mills of our own before, there hasn't been a wheel turned this year and every man in the neighborhood that has followed it has been making money." I don't want any better endorsement than that.

Mr. Boyd: How has your milk been disposed of?

Mr. Judd: I take it to the condensing factory.

Mr. Boyd: Do they estimate the butter fat in the milk?

Mr. Judd: Yes, sir.

Mr. Boyd: And do they pay you according to the butter fat?

Mr. Judd: No, sir; but they keep a record of it, they are testing it all the time. My herd has been tested about every two days right along.

Mr. Spicer: Would you advise a man that had a good silo to change to your way of doing?

Mr. Judd: I wouldn't advise at all, because I don't know anything about a silo. We are prohibited from that.

Mr. Spicer: If you feed out your straw, what do you bed your cows with?

Mr. Judd: I raise more every year than I feed the cows, and of course I thresh every year.

Mr. Spicer: What becomes of the rough corn fodder, stalks?

Mr. Judd: The stalk is trimmed right down and the pigs

come along and clean up all the corn and I let it lie till I can go in and take and scoop out as nice manure as you ever saw.

Mr. Newman: Was the feeding done at the World's Fair done under that system?

* The Chairman: No, it was not. They fed their ground grain almost entirely. Without doubt they were feeding to produce the best results; I do not think they fed a kernel of corn.

Mr. Boyd: They did not feed any whole feed of any kind except hay.

The Chairman: They probably were the best feeders in this country, at least they knew what would produce results.

Mr. Stewart: They fed regardless of expense, though.

Mr. Murphy: I would like to say a word as voucher for Mr. Judd's system, after about four years of nearly the same system, which I have followed very closely; I have been to Mr. Judd's and seen his place, his stock, etc., and they look well. I have not fed any grain for four years. I used to carry my grain to mill and have it ground, but I do not think it pays at all to pay five cents and upwards for grinding any more. I have had better success since I followed this system than ever before.

Mr. Judd: There are lots of young men who do not have help, they think they must have about one man to ten cows. If a young man marries and his wife is accustomed to milking, those two can handle a dairy of thirty cows under this system as well as they can a dozen; they can breed those cows so that they have about twelve at a time. If a young man has got back bone and a little grit, he can go out and buy a good farm and start up with this system of feeding and follow that thing up carefully and pay for the farm at the same time.

The Chairman: It seems to me so strange that there have not more men adopted that system. On the Fox river where they are making milk their entire business, I do not think you will find one that is feeding whole grain. They commenced in that way because they didn't have machines to grind, but they have changed from it.

Mr. Judd: There are lots of folks that think a thing isn't worth anything unless they put lots of expense into it.

Mr. Spies: I fed some whole grain when I first started on a small scale and I fed more hay than Mr. Judd, but I fed a lot of corn fodder, I left all the small ears in the corn fodder and I fed it outside on good hard dirt, in a place where they were sheltered by straw stacks. I was raising lots of wheat. I found after I built the silos that I could discount that system considerably in the yield of milk, and I thought my cows were healthier. I don't think a farmer ought to pay five cents a bushel for grinding, that is wasteful, I had a grinding mill myself. I hired an engine and a man to run it and he ran the engine for three dollars a day, and would grind 500 bushels.

Mr. Stewart: How did you get along selling your milk after you commenced with the ensilage?

Mr. Spies: After I increased to a sufficient quantity, I got two cents a gallon more for my milk, as I stated yesterday.

A Member: I should think the corn would get pretty hard.

Mr. Judd: Not if you keep it in the shock in the husk; it will if you husk it and put it in the crib and let it freeze there two or three times. Cows like it better with the husk left on.

Mr. Dorsey: I believe Mr. Judd is right. I have been feeding this last six years ground feed right along, running to the custom feed mill and having my food ground for practically nothing, but I changed to Mr. Judd's system, it saves husking corn and threshing corn. There is no waste about this method. The hogs follow the cattle and eat what oats and corn pass through whole and do well.

Mr. Murphy: You would be astonished at the big lot of hogs that can be kept running after the cattle, especially with brood sows, and how well they will do.

Adjourned till 7:30 P. M.

The convention met at 7:30 P. M.

The president in the chair.

Piano solo, Miss Clara Fraser.

THE REASON FOR ELGIN'S SUPREMACY IN THE BUTTER MARKET.

BY JOSEPH NEWMAN, ELGIN, ILL.

Mr. Chairman, Ladies and Gentlemen:—

The Elgin district was first opened up by cheese factories, which in time changed into butter and cheese factories, and later into creameries.

The first of these was at Richmond in 1866, opened up by our old friend Dr. R. R. Stone, who saw the natural advantages of the Fox River Valley and sent to Utica, N. Y., hiring D. E. Wood for his first cheesemaker, who later owned and operated the Huntley factory.

In 1867, Chas. W. Gould, another dairy pioneer, started the home factory on his farm east of Elgin, then Wanzer, Newman, Nolting and others, in rapid succession. These were later all turned into butter and cheese factories or creameries.

Thus commencing with Richmond on the north, it was not long before the Fox River Valley was made famous for making the finest cheese, and with Elgin in the very heart of the territory, it was very soon decided to go one step further and let one butter maker do the work of all the farmers' wives, and by so doing get together a large quantity of very fine butter all *just alike*. With this idea in view, and with the name of Elgin well and favorably known for its watches and other manufactures besides dairy products, the beginning of butter making in a creamery commenced. This was in 1870, when I. H. Wanzer, Dr. Jos. Tefft and others, constituting the Elgin Butter Co., built the factory on the west side of the river in Elgin, and later followed by the Fountain Creamery east of Elgin (where the writer received his early education in the practical workings of the creamery, under the guidance of I. H. Wanzer),

then A. Nolting built one near Elgin, and John Newman the Springbrook Creamery, west of Elgin, and others following in rapid succession until now the Fox River Valley is dotted with them, and the Elgin district has so expanded that we have crowded over the state lines in every direction, and the name of Elgin is referred to in every State of the Union where extra fine creamery butter is used, and the term "Extra Elgin" has come to mean a grade of butter and calls for the very finest.

'Tis true that other states than Illinois are making fine butter and we welcome them as comrades. We need their assistance for we must stand "shoulder to shoulder," to beat down the opposition of the Butterine men who evade the law and palm off their stuff, colored and made to imitate the finest creamery, and thus cheat and deceive the consumers. Also the "Process" Butter manufacturers, who make over old butter and grease by a so-called "Secret Chemical Process," so that it looks like pretty good butter. There are now Process Butter factories, or "Butter Hospitals" (which you please) in several states, but the enemy seeing Chicago has made such a pleasant and prolific home for "Oleo" seems to have made that city its headquarters. One firm of butter dealers being interested in the manufacture of this process stuff, right at Elgin, has built a large factory there the past season, I suppose to steal into the trade with their goods put up in attractive shape and sold as fresh churned full grass flavor butter from "our" factory at Elgin.

The Illinois Creamery Co., of Chicago, are doing their best to ruin the fine butter trade of Illinois, and at the same time, those interested (but under another name) are advertising in flattering words to creamerymen to ship them their creamery butter on commission—"Consistency, thou art a jewel." With these Process Factories going, and, as I understand, shipping from each one about a carload a day, and butterine sold as much as ever, is it a wonder that the New York market declines 4c per pound at a season when we naturally look for a stiffening of prices? With this traffic increasing, it behooves the farmers of the western states to think seriously before changing from their steers and stock raising into dairying, but with such bold frauds to face and

fight, we must all stand together and vote for such representatives and congressmen as will pass laws to properly protect the dairymen and consumers alike, by a National General Pure Food law, with commissioners to see the law enforced; or better yet, to come under the Internal Revenue Department for enforcement.

The founders of the creamery system in the Elgin District were wise and thoughtful—they built from the foundation up. First, looking over the country, they found by its natural drainage, its rolling pastures, its creeks fed by everlasting springs, that it was just the kind of a country for producing pure milk, and by delivering the milk from several farms to a central point they could produce a larger quantity of better butter than by each making it up into butter on the several farms. The dairymen themselves entered into the work, and as they had the benefit of the teachings of the Illinois Condensing Co., for several years previous, they were prepared to deliver milk in large quantities from each farm.

It must be understood that in speaking of dairying in the Elgin section, that in nearly every instance each farm is a dairy farm, and not a stock and grain raising farm with the dairy as a second consideration. The farms will average about 200 acres each, and it is not an uncommon thing to find a dairy of fifty to seventy-five cows, with an average probably of fifty. Hence they make a business of dairying, feeding all that is grown on the farm, and buying bran to lighten up the corn and oats, one-third of each being the ordinary ration, the coarse feed being the corn fodder cut and threshed or shredded, as much as they will eat, in bad weather the cows are kept in the barn. A great many have water in the barn in easy reach of each animal all the time. The barns are kept well cleaned, and the cows milked regularly at a *stated time* night and morning; as fast as it is milked the milk is strained and put through an aerator into eight-gallon cans which are then set in a tank of water to cool, stirring often. It is then ready for market. The factories that purchase the milk have inspectors

to see that the farmers follow the above conditions, and also to see that the utensils are kept clean.

(In this line I would call attention to the model dairy farm of our fellow worker, Mr. H. B. Gurler, which stands at the head and is easily a leader in the Elgin section, and its founder stands preeminent as an exponent of dairy knowledge.)

With milk coming to the factories in splendid shape, the creamery men were enabled to produce a butter that has stood at the head for years.

Then the market was looked for and easily found, for fine butter was eagerly sought after. It was then they showed their wisdom again, for in 1872 they founded the Elgin Board of Trade, a market for the *producers* of fine butter, which has, by steady growth, come to be the largest producers market in the world, as shown by the last report made by its secretary, which I will read.

Monthly and Yearly Totals.

1897.	Lbs. Butter.	Lbs. Cheese.
January.....	3,095,674	1,039,271
February.....	2,920,676	999,197
March.....	3,301,383	1,041,078
April.....	3,619,856	940,402
May.....	4,671,726	1,135,475
June.....	5,277,399	980,741
July.....	4,849,281	527,512
August.....	4,074,728	436,462
September.....	3,331,792	520,308
October.....	2,994,137	604,072
November.....	3,132,603	608,798
December.....	2,954,765	687,352
Totals.....	44,224,020	9,520,668

Year.	Lbs. Butter.	Lbs. Cheese.	Cash Value.
1897.....	44,224,020	9,520,668	\$9,756,063.10
1896.....	38,655,249	7,279,977	7,356,088.18
1895.....	39,028,543	10,696,010	8,720,669.00
1894.....	32,550,290	5,735,029	7,580,147.04
1893.....	30,986,525	6,361,793	8,639,057.87
1892.....	30,496,284	7,115,735	8,315,286.22
1891.....	25,006,652	6,232,492	6,771,101.23
1890.....	24,701,492	5,052,420	5,707,442.50
1889.....	21,826,178	5,781,768	5,208,765.75
1888.....	17,195,578	3,009,020	4,575,689.52
1887.....	13,506,021	4,862,830	3,787,182.62
1886.....	5,977,000	1,943,984	1,573,502.50

1885.....	8,358,804	4,675,273	2,283,062.05
1884.....	9,230,025	11,856,151	3,364,353.91
1883.....	7,274,071	13,174,092	3,282,527.19
1882.....	5,650,915	10,960,207	2,752,331.56
1881.....	3,868,629	11,327,525	2,219,600.04
1880.....	2,670,877	9,226,474	1,801,303.09
1879.....	977,879	3,648,879	539,143.67
1878.....	1,113,955	4,897,345	755,597.15
1877.....	1,564,930	5,012,553	1,059,085.08
1876.....	1,216,725	4,551,229	767,640.68
1875.....	896,527	4,256,340	496,220.04
1874.....	698,522	3,349,274	378,525.58
1873.....	236,877	2,076,500	219,177.53
1872.....	30,734	993,560	81,000.00
Totals.....	367,853,203	163,597,129	\$98,000,563.10

Average Prices.

	For 1896.	For 1897.	For 26 Years.
Butter.....	17 ⁹ / ₁₀ c.	18 ³ / ₈ c.	27 ³ / ₈ c.
Cheese.....	6c.	6 ¹ / ₂ c.	7 ¹ / ₂ c.

Number of Factories represented on Board.....	424
Number of members.....	293

The total of nearly \$100,000,000 business done since the Elgin board was organized, is something of which the members and the district feel proud.

The Elgin District as represented on the board comprises Northern Illinois and Southern Wisconsin, yet its influence is felt wherever fine butter is sold; in all parts of the world. I could go into more of the history, but I think that part is covered sufficiently to show its part in "The reason for Elgin's Supremacy in the butter market." Its creamery being the first, in the West at least, to be able to sell a lot of fine butter, every tub of which was just alike both in color, salt, package and quality. It was a revelation to butterbuyers, and the name of Elgin soon became noised abroad as the home of the manufacture of the finest butter in the land. It being the finest, it was not long before the unscrupulous were trying to palm off poorer and cheaper goods as Elgin; hence, it became necessary to adopt

rules on the Elgin Board of Trade as to what constituted "Fine Elgin Butter," and the rule stands to-day as follows:

CLASSIFICATION OF BUTTER.

All butter offered upon this Board shall be assumed to be butter churned, salted and packed in a creamery, from cream which is separated from the milk in the creamery where the butter is made, unless otherwise designated.

Extra—Flavor must be quick, full, fine and fresh; taste must be pleasant and sweet; brine perfectly clear and little of it; body and grain must be perfect; color even and uniform, and good for the market for which the butter is intended. Properly salted, neither gritty nor flat. Package, good and uniform, and not less than five hoops for a sixty-pound tub.

TARES.

Section 1: In the sale of any property in packages, involving the question of tare, the actual weight of packages (ascertained by stripping at the time of delivery) shall be deducted from the gross weight. In case the purchaser shall require the weighing and stripping of butter that has been delivered on marked weight, such weighing and stripping shall be done, and the result reported, within three (3) business days (including the day of delivery) after delivery, or the purchaser shall have no right of reclamation on the seller.

By the adoption of this rule we keep our Elgin Butter the highest grade, and living up to it is to my mind the key-stone which binds the dairymen together, so that Elgin retains "its supremacy in the butter market," and to keep their butter up to grade is what the creamerymen of the Elgin district work for continually, using the newest machinery that will assist them in that direction, and by knowledge gained by long experience, combined with pure milk to commence with, they are enabled to lead the forces of the dairymen, ever taking as a watchword "Excelsior."

To sum up in a few words: If I should build an arch on which was inscribed "The reasons for Elgin's Supremacy in the

Butter Market," the foundation would be the natural advantages of the Fox and Rock river valleys, the corner stones would be the intelligent dairymen who keep abreast of the times in the matter of producing pure milk and plenty of it; the creamerymen of the Elgin District who always lead in the art of making fine butter, would be the arch stones, all cemented together and finished with the Elgin Board of Trade, "The Producers' Market," as the keystone holding them firmly together in business integrity.

Recitation: Miss Cornelia Neltner, West Chicago.



R. A. PEARSON.

ADDRESS.

BY R. A. PEARSON,

ASSISTANT CHIEF OF THE DAIRY DIVISION, U. S. DEPARTMENT OF
AGRICULTURE, WASHINGTON, D. C.*Mr. President, Ladies and Gentlemen:*

It is with a feeling of pleasure and honor that I stand here to-night, as the representative of the Dairy Division of the United States Department of Agriculture, at the meeting of the Illinois State Dairymen's Association. You well know that our Secretary of Agriculture the Hon. James Wilson, and the chief of the Dairy Division, Major H. E. Alvord, and a great many workers in the department are heartily interested in this dairy industry. Major Alvord has been attending a number of dairymen's conventions recently and it was with regret that he had to give up coming out here. Your worthy secretary, Mr. Monrad, has represented the division at a number of meetings in the Western States in the past few weeks, but being engaged as he would be at this meeting, it was thought best to send some one to take his place to tell you something of the work of the Dairy Division. The understanding was that when I came out here to your meeting if I found anybody who knew any less about dairying than I did I was to teach him something, and if I found anybody who knew anything more than I did, I was to learn something. It is quite unnecessary to say that I have not been teaching. I have been learning ever since I came out here.

The Dairy Division was created about two years ago; thus far we have issued seventeen publications, probably many of you have seen more or less of those publications. There is one quite full of statistics of the dairy, giving the number of cows in each state of the United States and the amount of butter and

cheese produced and the value of the products and a comparison of the industry here with that in some other countries. We have issued one on the different forms in which cheese is manufactured; another one on how to sell good cheese and how to avoid being deceived by unscrupulous dealers. We have issued a popular bulletin in the Farmer's Bulletin Series on Facts about Milk, tried to tell the people in the cities how they should take care of milk and that they should use much more of it than they do. We have issued several bulletins relating to the dairy in various sections of the United States. We have issued a bulletin on dairy schools and their work. We have issued a bulletin on creameries and cheese factories, one on taking care of dairy utensils intended specially for creamery men. Another one is on the dairy herd, this is in the Farmer's Bulletin Series, and would be specially useful to farmers building up a herd; it treats of the formation and care of the herd and is written by the Chief of the Division, Major Alvord. Another one is on making butter on the farm by Mr. Goodrich, of Wisconsin, another one on taking care of the milk on the farm before it is delivered to the factory. Another one is on the cheese factory.

All of these bulletins are delivered to persons whose names are on our mailing list. If there is any one here to-night, who wants any of those bulletins and he will drop a postal card to the Dairy Division Department Agriculture, Washington, D. C., they will be sent to him.

I might refer to some of the work which we have in hand. We are compiling all the dairy laws in force in each state in this country and we expect to supplement by adding those that are enacted later and noting changes. We are studying dairy herds, finding out where most of our products are produced, where there is a surplus of production and where the production is too small. Most of you have noticed accounts in the papers of the experiments which have been made in exports during the administration of the present secretary. One of the first things he did when he came into office was to look over the market for our butter, and he decided that we should be able to send but-

ter to the foreign markets and sell it at a profit. We have made nine shipments from our department of the best butter made in the country, each shipment averaging about ten to fifteen thousand pounds and all the information connected with that is being gathered together and will be issued in a short time in the shape of a bulletin and will be sent out widely over this country. We are working on dairy breeds. There are several other subjects that I might refer to but I will not take your time. I was asked to prepare a paper for this meeting and knowing that this is a section of country where a large amount of milk is produced for the city market, I thought that a subject best suited to the occasion might perhaps be.

CITY MILK SUPPLY.

As far back as history dates milk and its products are frequently mentioned. It has always been regarded as an important and necessary human food. The Bible often mentions cheese made from camels' and goats' milk, and we are told that Abraham entertained his supernatural visitors with a form of butter when they were on their way to warn Lot. It may be inferred that milk was in common use in those days and that it was highly valued, for the sacred writers could find no stronger terms, in addressing a pastoral people, concerning physical and moral beauty, than the expression "milk and honey".

For many centuries dairy farming has been a necessary and interesting industry and its praises have continually been sounded by poets and writers. History tell us that the wandering Arab considered milk abundantly adapted to his needs. His camel was always with him and she converted the tough, dry shrubbery of the desert into a food acceptable at any time. The Laplander and Siberian depend largely for their existence on the scanty produce of their reindeer, and the inhabitants of the mountainous parts of Europe keep sheep and goats for the same purpose. In cultivated countries these animals are almost en-

tirely supplanted by cows. The history of the development of the cow and the uses of her products is an interesting study. To-day dairying is a most important branch of agriculture, and the most important branch of dairying is the supply of milk for consumption. There have been many ways of producing milk, and as many of getting it to market. One custom, which is not even now entirely extinct, was for the dairyman to drive his cows from house to house and milk into each customer's vessel as much as he required. Of course this simple system had the advantage of getting the milk to the consumer while fresh, and the usual forms of adulteration were not easily practiced. But the objections to it are so evident, it does not seem that any one intelligent enough to have a cow would continue to follow it. From the primitive method of producing and marketing milk, the industry has slowly advanced to its present condition. Small towns are now furnished with milk largely by cows kept by the residents, one family having one or two cows which supply themselves and a few of their neighbors. This town milk is supplemented by the product of a few near-by dairies. The system is as simple as possible, every one knows just where his milk comes from and how it has been produced. The milk business of large cities is of necessity quite different. Many dairies are found in the vicinity of every city and their owners or tenants drive in each morning to serve their routes, but the territory within drawing distance of the market is not capable of supplying all the milk needed, and it has been gradually extended. It is now a common practice to ship milk by rail one hundred miles or more. New York city draws its supply from points 350 miles distant; special milk trains are operated on almost every road entering that city, and the amount of milk they carry in a year is almost incomprehensible,—the daily receipts are little less than one million quarts.

In some respects the present system of supplying milk to cities is most admirable. Necessarily the milk is older than that served in towns and villages, as it has to come greater distances, but for this reason it receives special care and, although it is twenty-four to thirty-six hours old at the time it is served, it is frequently in better condition than newer milk which has

been carelessly handled. Facilities for shipping milk long distances are continually being improved and it is sometimes suggested that Kansas and Iowa milk will in the future be sold in New York city the same as Kansas and Iowa butter.

Milk is usually transported in heavy cans, the common sizes holding twenty, thirty or forty quarts; the styles in use differ in different localities. Within the past few years some dairy companies have established bottling stations near their producing farms and ship the milk in jars, which in hot weather are packed in ice. The milk is cooled as much as possible before it leaves the farm and for long distances ice is kept in the cars, or refrigerator cars are provided. The use of glass jars or bottles for handling milk is rapidly gaining favor and they are widely used. They are objectionable because heavy, fragile, and so useful in the kitchen that they are not always promptly returned, but these objections are more than offset by their advantages in being cleaned easily, in being an exact measure, and in saving the milk from unnecessary exposure.

The resident of a large city can obtain almost any quality of milk which he desires; poor milk and rich milk, cheap milk and expensive milk have long been on the market and it is very rare that an almost perfect milk can not be found.

Of the 17,000,000 cows in the United States it is estimated that 5,000,000 produce milk for direct consumption, the average being about twenty-five gallons per year to each person, or an ordinary sized tumbler full every day. As many use a much greater quantity the number of those who use little or none must be very large. It seems strange that the milk consumption of this great dairy country is so small, while in some of the older European countries it is two or three times as large. As this is a matter which directly concerns the dairymen, and it is a question second in importance only to the cost of production, it will be interesting to discuss a few of the causes which keep down the consumption of milk in our cities.

Without doubt some of the trouble is with the consumers and it is equally plain that some is with dairymen and milk dealers, and by doing all in his power the dairyman can accomplish a

great deal toward increasing milk sales. A few city people refuse to use milk because they think it is more or less a mixture of water with chalk, flour, starch, sugar or calves' or sheep's brains; they have read some sensational yarns about the cow with the iron tail or the various ways in which the countryman increases his milk between the farm and the market, and they will have none of it. They cannot be helped but they should be pitied; for without doubt they are more liable to eat sand in their sugar, copper in their peas, or miscellaneous leaves in their tea, than to suffer from any of the adulterations of milk which I have mentioned. I have been told that a certain house having a large trade in spices actually receives more loads of buckwheat hulls and similar material than of our pure spices, but they sell only a guaranteed article.

Some persons have such strange ideas of what pure milk should look like that it is impossible to suit them with the genuine article, for none is produced which corresponds with their notions. They may insist on having it pure, but more yellow than a Guernsey cow could produce. Such persons are not satisfied until they find a milkman who is willing to stretch his conscience enough to think that the addition of a little cheese color is no adulteration and of such small importance that he does not need to think of it when he says his milk is pure.

I one time knew a lady who said she would not think of changing her milkman because he always brought her the milk from the same cow and he had done it every day for 17 years! She was so happy in her delusion that I could not bear to tell her that cows do not usually give milk that long or that her dealer was supplied by several hundred cows and made a practice of mixing his milk. Another lady insisted that a jar of milk could not be fresh if it showed any cream at the time of delivery, and the only way to satisfy her was to instruct the driver to hold the bottle upside down a few moments before taking it to the door.

These peculiar cases are exceptional and they account but little for the small consumption of milk; a cause of greater consequence is the fear of many persons that milk is a disease car-

rier. They have learned that certain diseases of animals may be transmitted to the consumers of their products, and that the diseases of the laborers in a dairy may be carried in the same way. And these fears are emphasized by the not infrequent reports of outbreaks of diphtheria or typhoid fever, said to have been started from infected milk, or by the occasional action of a Board of Health or Milk Inspector in quarantining a certain section of country from which comes a considerable part of a city's milk supply, on account of a disease reported to be prevalent there among the cattle. The fears sometimes develop into widespread alarm and there is a great decrease in milk consumption. Many persons who can get along without milk stop it entirely, others use the smallest amount possible. The dairymen have large surpluses on hand and are great losers. Usually as the scare subsides the amount of milk used increases but the harm cannot be wholly overcome. It is unfortunate that there is some foundation for such apprehension. Milk has been the means of conveying disease to its consumer, but pure milk has never done so; it has always been milk that was contaminated in some way which might have been avoided. This fact seems simple enough but it is somehow as easy to forget it as it is to see its truth.

Another cause of the small consumption of milk of equal and perhaps greater importance than the one last named, is the difficulty which many city people have found in getting a pure, clean and satisfactory article at all times. We know too well that all the milk sent from the farm is not what it should be. Some of it is not clean and there is just enough such milk to do great harm in the market. Impure milk and dirty milk are the bane of the city milk business. An English paper expresses the condition of a part of the milk served in their market by saying, "The Briton drinks a glass of milk as nearly as he can to the bottom; but is warned off by a sediment which the naked eye can detect, and which produces a shudder." The same might be said of some that is sold in our cities. When a sensitive person has drank a few glasses of such milk he is usually ready to give up milk as a beverage. We commonly meet persons who have become so disgusted in their attempts to make milk a

regular part of their food that they have stopped its use and cannot be persuaded to even taste a glass which they are absolutely sure is pure in every way. "A burnt child dreads the fire," and many who have had an unpleasant experience with milk, dread it in any form. Some people who recognize that milk is a necessity regard it almost as a medicine and use it accordingly; as soon as the baby is old enough, other food is substituted and milk is used only by the spoonful.

Some intelligent and careful dairymen have recognized that the two causes just named are the ones which operate strongly against their business; they have taken advantage of these facts, handled their dairies accordingly and to every appearance they are well rewarded for their foresight and good business ability. Their methods will bear examination, study and repetition.

It should be remembered that the production and handling of milk is no longer a rule of thumb occupation. It is a science, and this science has developed and broadened greatly within the past few years and is still developing at a rapid rate. Formerly the dairymen performed his work always in the same manner because he knew by experience that certain results would follow, little was known of causes or effects, and with such a poor understanding of his work, not a great deal could be expected in the way of improvement or successfully dealing with changed conditions.

Successful dairying is intimately connected with several sciences and one of the most important of these and the latest to be understood is bacteriology. This science has done much to explain the changes of milk, just what causes them, how they may be checked and how they may be avoided. It teaches us that very small organisms, called germs or bacteria, are the cause of milk becoming sour or otherwise changing. There are many kinds of bacteria and the different species produce different effects when they get into a substance in which they can grow. The sour milk bacteria is the most common in the dairy, but they are not the only ones; some make milkropy, others produce colors and many cause less marked changes.

They are all objectionable, so far as is known, in milk

intended for consumption, and if they could be kept out the milk would not change. But on account of their minute size and omnipresence, this is a practical impossibility, and the dairyman is compelled to depend upon one or both of two resources: (1) to allow as few as possible to enter the milk, and (2) to allow them to increase as little as possible after they have entered the milk. There are several ways of checking or entirely preventing the growth of bacteria, but only a few are adapted to a food product such as milk. Various chemicals are sometimes added to milk but while a few advocate their use the weight of opinion is against them. The most common so-called preservatives contain salicylic acid, boric acid, borax or formaldehyde, which are not regarded as poisons but may have an injurious effect when taken in the system in regular small doses. Their antiseptic or germicide qualities may easily interfere with the natural processes of digestion and the danger becomes greater because of their supposed harmlessness and the use of larger amounts of them than is actually necessary for the purpose intended.

The development of bacteria is also checked by extremes of temperature and the use of heat or cold for this purpose is perfectly safe. It is well known how quickly milk spoils in a warm place, and how long it may be kept sweet at a low temperature. At ninety degrees Fahrenheit the germs grow with great rapidity and the rate of their increase decreases with a decrease of temperature,—at fifty degrees Fahrenheit they are quite inactive, but at this and considerably lower degrees of heat they retain life and some forms continue to multiply. It has been shown that at ninety-three degrees Fahrenheit certain germs may increase in numbers, in four hours, more than 200 fold, while at fifty-five degrees Fahrenheit they would increase only about eight fold. Up to a certain point the higher temperatures have the same effect as cold, i. e. make the germs inactive. But when the heat is raised to 125 degrees Fahrenheit some are killed, those not harmed by this temperature are destroyed by greater heat. A sufficient temperature to kill almost all of the growing forms found in milk is

165 degrees Fahrenheit. The Pasteurization of milk or heating it to high temperatures for the purpose of killing bacteria is now quite extensively practiced.

Successful dairy companies supplying the purest milk, are in operation in and near almost all the large cities, and their success is due to the fact that they have taken advantage of the points which we have mentioned, and others equally well known. How much it pays the owners I do not know, but if we can judge from appearances, it pays well. When it became known a few years ago that a dairy farm in New Jersey was about to conduct its business in such a way that it had the endorsement of a large number of well known physicians, the people of the locality began to send their orders for the product of that farm; it has been almost impossible to keep up with the demand, and a few months ago, when I visited the dairy, the herd consisted of 400 cows, and I was told that all the milk was sold at retail, part of it at twelve cents a quart. Other instances might be cited of companies working along similar lines.

In order to put out a superior milk, always up to a high standard, superior methods are essential and the cost is necessarily increased, but this should be kept as low as possible for there is usually an objection on the part of consumers of milk, to any increase in the price; however, this is being gradually overcome with the aid of physicians and others who understand the many advantages of sanitary over unsanitary milk. Considerable quantities of milk are now sold at advance prices, as ten and twelve cents per quart. I have sold milk at thirty-five cents a quart to parties who wished to have it sent to them daily by express, while they were out of the city in the summer. They preferred to pay this price rather than use the milk regularly sold where they were, but concerning the quality of which they knew almost nothing. Certain companies make it a regular practice to send milk by express to distant points because the purchasers do not know where they can obtain any made as carefully in their own vicinity.

A full description of a model dairy farm and the operations conducted on it would be too long for this paper, but a few of

the principle features may be mentioned. The aim is always to protect the milk from every form of contamination, especially by germs of disease, or less dangerous ones which may cause the milk to spoil or unfavorably affect it. The number of bacteria found in milk which has not been carefully produced and cared for is tremendous; there are frequently many millions of them in a single drop. Experiments have shown that the contamination of milk occurring under ordinary circumstances can be reduced over ninety-five per cent by taking care to avoid all possible sources of impurity and conditions favoring germ growth. The fact that bacteria are usually attached to larger bodies makes the work of preventing their entrance into milk comparatively easy. But with all the care that it is possible to observe, some bacteria will get into milk; therefore it must be cooled as soon as possible to prevent their multiplication.

The first requisite for pure milk is a healthy herd. Sick animals or those suspected of being sick, should never be allowed to remain with those furnishing milk for consumption. On every dairy farm there should be a proper place for keeping animals that are out of condition. Model dairies have stalls in a part of the stable separate from the main herd, or in a distant building for this purpose. I have visited large dairies where there were no such arrangements, and was told that they were not needed because every animal was always in perfect health. One has good reason to doubt the purity of milk from a place of this kind. When a herd is known to be sound, every precaution must be taken before adding new animals to it. In one case, carelessness in this respect resulted in the loss of about 100 cows that had been in good health until a few fresh milkers, supposed to be healthy also, but later proved to be tuberculous, were introduced into the stable.

A cow under excitement or not in good condition is liable to give abnormal milk, but there is little danger of a healthy, well cared for cow giving anything but a natural product. Any form of excitement should be avoided and brutal treatment never tolerated. An untrained dog may do great harm and should not be allowed in the pasture or barn-yard.

The question of the feeds which can safely be used in a model dairy is one of decided interest. Large companies which buy their milk and have an established reputation for their output have learned by experience that certain feeds may sometimes be used in such conditions as to taint the milk, and some of them treat the difficulty with, what would be called in medicine, a shot-gun remedy, they prohibit altogether a long list of excellent feed stuffs, such as ensilage, brewer's grains, cotton-seed meal and gluten. A dairy supplying a large and particular city trade feeds ensilage the entire year and the milk gives good satisfaction, very many dairies use this feed in the winter, and the other feeds named are used as successfully. If a certain food is supposed to give flavor to the milk, it may sometimes be used without bad effect if fed immediately after milking, thus giving time for its flavor or odor to be out of the stable and the cow's system before the next milking.

The health of employes of a dairy is also important, one having any kind of a contagious disease or sores should not be permitted to work about the herd or the milk, and if a contagious disease appears on a dairy farm there should be no communication between the house and the dairy until all danger is past and the building has been properly disinfected.

A dairy may usually be fairly judged by the general condition of cleanliness that obtains. We frequently hear of the almost immaculate cleanliness of dairies in some parts of Europe, especially Holland, where the stable and house are under the same roof and the dilligent housewife takes as great pride in the cow stable as in any part of the house. There are dairies in this country which are kept equally well. Cleanliness is their motto and it is observed in every particular. Every cow is curried and brushed daily and the udder and lower parts are always brushed just before milking. For this latter a damp cloth is recommended, so the dirt which is not removed will be moistened and less apt to be shaken off during milking. Care should be taken not to make the parts too wet or drops of impure water will fall into the pail; it is also necessary to use care lest the cow take cold by the operation.

The attendants should be clean in appearance and habits, their clothes and hands require special attention. Outer garments used only when milking and handling milk, should be worn, and it is well to have them of some white material so they will show plainly when they have been soiled. Water and soap should be convenient so the milkers can easily keep their hands clean. In one large dairy the forman inspects the milkers before the work commences, and if one appears with soiled hands or dirty nails he is sent back to the dressing room to fix himself properly.

It is a mistake to have a dairy stable too small or poorly lighted; it should have a liberal space for each animal and be well provided with windows and ventilators. It should be kept clean all the time, a little attention occasionally is not sufficient. It is well to have an attendant pass through the stables several times a day to remove all droppings. When the herd is large, a boy or man may well be continuously employed for this purpose. The entire stable should be frequently given a thorough cleaning, and no corner should be overlooked. All dried accumulations about mangers and stalls should be removed, and when necessary, hot water and soap should be used to aid in the work. A coat of whitewash, renewed at least twice a year, adds much to the cleanliness of a building.

The first thing to be considered in the handling of milk is the utensils. Those made from a hard, smooth material are the best, and great care must be taken to get vessels which are simply constructed and can be easily cleaned. Sharp corners are lodging places for dirt and they should be avoided. A dairy utensil is not perfectly cleaned until it has passed through at least two wash waters and been sterilized. It is sometimes said all that if a vessel is cleaned enough to remove the milk the bacteria will also be removed, but utensils are not always so carefully cleaned, sometimes a little place escapes the brush, and unless the germs there are killed they will seed the next milk with which they come in contact. Furthermore, after a few articles have passed through the water it is more or less contaminated and every drop of it which remains on an article con-

tains many germs which should be killed. Some times trouble has resulted from the use of impure water for cleansing dairy utensils; the danger of this is reduced by a general practice of sterilization.

All the processes through which milk passes after it has been drawn from the cow should be conducted as rapidly as possible. It cannot be removed from the stable air too quickly, and as soon as it arrives in the dairy room it should be immediately strained and cooled. The manner in which it is handled the first thirty minutes chiefly determines the length of time it will keep sweet. Every moment it is left at the high temperature it is rapidly changing. The best dairies have facilities for straining and cooling the milk within a few minutes after it is drawn, and this is one of the big secrets of their success. If a cold spring is not available, ice should be had, and in the long run it will pay to use it liberally.

Everyone is agreed that the consumption of milk would greatly increase if sanitary methods were more generally observed in dairies where city milk is produced, but the great difficulty is, all dairymen cannot be persuaded to follow the best methods, and those who are willing to do so are unable to receive the benefits they should because their milk is sold with the bulk and loses its individuality by the time it reaches the consumer. Some scheme should be devised by which a single dairyman, who is willing to conduct his dairy in the best possible manner, would receive the benefits of his extra labor and expense. In a few districts a plan is being tried which promises well. A competent committee is formed, largely made up of physicians and others who understand perfectly what good milk is, and they draw up a set of regulations which they consider should be followed in every dairy. A dairyman who agrees to adopt these regulations receives the endorsement of the committee and is permitted to make use of this fact in obtaining new trade. It seems that the idea might be carried a little further and arrangements made, either by a body of physicians or by a competent committee, under the supervision of the Board of Health, for making the chemical and bacteriological

examinations of milk from all dairies willing to sign an agreement to follow the regulations of that body, and to keep their cattle and dairies in the condition prescribed. The expense of such supervision would not be large and could easily be borne by the dairymen. As soon as it was announced that such a system were provided, and the dairies would be inspected when their owners desired, and that places which were found to be satisfactory would be given a certificate or would have their names placed on the published list of satisfactory or "approved" dairies, the best dairymen would register, and others would find it to their advantage to follow the example of their competitors. The examinations should be conducted for the smallest possible fee and the inspections made frequently enough to keep fully informed as to the conditions of the dairy. If one were found to be negligent of any of the conditions to which it had agreed, it should be dropped from the honor list. Dealers would doubtless find it to their advantage to advertise that milk from listed dairies only, was sold on their routes, and they might pay a little extra for it (or a little less for that not from listed dairies) and thus induce their shippers to keep the dairies up to the standard set.

In a recent conversation with one of the leading milk dealers in a large city, he agreed that a scheme of voluntary inspection, similar to that outlined, should do great good, and suggested that it could well be extended to places where milk is sold in cities, milk shops, etc. If such a plan were adopted, persons who cannot make frequent visits to the country could be sure that the milk they purchase is perfectly pure in every way, and the natural result would be more milk used.

It has been said that if all Americans would spread a little more butter on the bread they eat and insist on having a piece of cheese with every piece of pie, we would have neither of these important dairy products for export, and one of the great problems—how to handle our surplus—could be dismissed from our minds. At the same time we want the American people to increase the amount of milk they use, not slightly, but double it. A glass of good milk twice a day would be relished by almost

everyone. Such an increase would be a benefit to all concerned, and prosperous days for many dairymen would be at hand.

Duet, Millie Hagerman and Emma Loesch.

THE HEN AND THE DAIRY.

BY MRS. M. SAUER.

(Read by the secretary.)

I prefer to tell what skim milk is worth for chickens. Skim milk is a famous egg food. Do you know that? I kept a proper account of it. There is lots of money in it, even if we would pay twenty-five cents per hundred for skim milk and market value for other kinds of feed. The skim milk makes a big difference and is excellent food for young chickens or turkeys or any kind of young fowls.

Recitation, Miss Neltnor.

Stella Bodinger, Piano Solo.

WANTED—A STATE DAIRY COMMISSIONER.

The following letter was read:

J. H. MONRAD, ESQ.,

Secretary State Dairymen's Association,

DEAR SIR: I have until within a few days fully expected to attend this Annual Meeting, but at the very best I find that is impracticable.

The grand jury of Winnebago county is in session this week and they are very anxious that I should be in attendance and assist in prosecuting some of the violaters of the state law. There are 14 government licenses in Rockford alone, and we hope to make an example of one or more this week.

I find, however, that Kane county leads them in this iniquity as Aurora has 16 licenses, and our good people in Elgin only have one, but I believe the hotels and restaurants there buy of the wholesale dealers direct.

My especial purpose in writing this is to ask you to give the subject of amending and enforcing the law some prominence in the meeting, and let our friends in central and southern Illinois fully understand that the subject must not be lost sight of for some time to come. We must have an amendment that will give us an appropriation, and a dairy commissioner who can go out with the authority of the state at his back.

In order to secure this the dairymen must keep up the agitation and give the senators and representatives to understand that the work demanded of them is not yet done.

Our only hope in securing this is through the country senators and representatives, the same as we did with the work last spring.

We are promised a decision here this week in the cases which have been tied up so long, but we feel but little confidence in their promises.

Politics permeates every action here and while I do not believe the judges will stoop to do a corrupt thing in rendering judgment, they realize that they have some powerful friends in the butterine interests whose influence may be felt in a renomination, and that every week's delay is a great deal of money to those people.

I trust that you will have a very successful meeting at Red Bud. My experience teaches me that there are in no part of the state more loyal or earnest dairymen than in central and southern Illinois and I regret very deeply my inability to meet with them at this time.

Yours very truly, GEO. W. LINN.

President Illinois Dairy Union.

ADDRESS.

BY D. W. WILLSON, ELGIN, ILL.

I have been in the fight for pure butter and cheese many years, coming from the east and landing in Elgin some twelve or fifteen years ago, when the fight was on regarding oleomargarine. I have done what I could with my voice and pen and helped to secure through our National Legislature the Oleomargarine Law by which oleomargarine is placed under the control of the Internal Revenue Department. We thought we had pretty well squelched the matter, but the greed of man still came forward and instead of this stopping it I believe it made it worse, because it made criminals of men who formerly had been honest. We have had all sorts of experiences in trying to enforce that law and to regulate the sale of oleomargarine and filled cheese and I have been in that fight right along. We had built up a strong national sentiment against the fraudulent article.

The next fight that I was engaged in was in the legislature that was elected in 1894 to go down to Springfield to make laws for the people of the State of Illinois. We had supposed up to the last moment of the last session that we should secure a vote on a bill prohibiting the coloring of oleomargarine in the semblance of butter and providing for a dairy commissioner to execute the law, but we never could get it to a vote before the Senate.

The fight was taken up along the same lines in the next session of the Legislature and last year we secured the passage of a law of that kind. but unfortunately no provision was made for a dairy and food commissioner and I want to leave for your consideration the suggestion that there will be an election in this year of 1898. for representatives to the Legislature of the State of Illinois, and it must be your business to see that only such representatives go there as will work against the adulteration of food and will help to secure the passage of a bill providing for a dairy and food commissioner. The farmers are the food pro-

ducers, the only food producers in the country, and if the market is destroyed for those products, where is the business of the country going to generally?

Gentlemen, all I can say is, that every time that any man comes before you asking your suffrages to put him into the State Legislature or the National Legislature, ask him one or two straight questions: "Do you favor Pure Food Legislation," and "Are you going to work for it," and tell him no man can represent me in the halls of Congress or in the Legislature of the State of Illinois unless he will favor that kind of legislation. If the farmers, the food producers of this country, will but work together along these lines, we shall get an era of pure and not adulterated food.

Mr. Judd: Do you farmers realize that the olemargarine production in this country amounts to the production of 750,000 cows a year, it takes the place of all the butter those cows can make. Do you realize that it takes nearly 200,000 men to take care of that number of cows? Do you realize that there are fifteen to twenty millions of dollars invested in farms and implements and stock connected with those cows? Do you realize the amount of feed it would take annually to feed those cows, how it would raise the price of corn and the price of your butter and the price of every pound of milk that is sold in the city of St. Louis and every other city in the state? If you can only realize these things and will demand of your legislature what you ought to have, we shall be able to bring on this era of which Mr. Willson speaks.

Recitation, Miss Neltor.

The convention adjourned till 9 o'clock the next day.

The convention met at 9 o'clock A. M., Jan. 13.

The president in the chair.

THE VALUE OF THE SILO.

BY R. R. MURPHY, GARDEN PLAIN, ILL.

The secretary having assigned me the subject of ensilage I find I will have to depend mostly on quotations from other writers. There are several very important things to be considered and very strictly adhered to to make the storing of ensilage a success, (going on the supposition you have your silo built and ready to fill.) From what I have experimented I would want the cutter set to cut three-fourths of an inch in length, and now comes the most important help in the filling of of the silo. The man in the silo must be one of good judgment and not afraid of some hard work. He must keep the lighter and heavier parts of the corn (as it is corn mostly put in the silo in this country) well mixed and the sides and the corners well tramped down and keeping the outside the highest all the time. If the lighter and heavy parts are not kept well mixed you are very liable to have mouldy spots in your silage when you go to feed out. I will now quote from Stewart on feeding animals: Ensilage as a Complete Ration. Ensilage as generally discussed in this country has been used to signify preserved green corn. This single food is quite inadequate to the complex wants of the animal system.

It is deficient in albuminoids to nourish the muscular system, and deficient in the phosphates to build the bones. Yet it is a very valuable ingredient in the ration of animals because of the large weight grown upon an acre, and because it is relished by all our farm animals. Some of the grasses and clovers are rich in the elements in which corn is deficient. To make a complete ensilage ration only requires a proper combination of green grasses and clovers with green corn. Corn having the least proportion of albuminoids can seldom be used for more than half of the ration. The next quotation is storing several ensilage crops together.

If second crop clover is ensilaged with corn, the clover fills the spaces between the coarser pieces of corn, makes a more

solid mass than corn alone, and more effectually excludes the air, so that it is an advantage in the preservation of the ensilage, and besides, it will furnish the more nitrogenous addition to the ration which the corn requires. If corn, millet and clover are ready at the same time, they may be all ensilaged together to the great advantage of the resulting preserved fodder. This combination would give a complete ration for milk without the addition of grain. As my opinion of the real value of any paper is the discussion that follows, to bring out the views of different persons on the subject, that have used a silo, I will close with the hope of there being a free discussion of the subject.

DISCUSSION.

Mr. Judd: Have you ever put clover with your corn into the silo?

Mr. Murphy: No, but I am satisfied it would be a good thing. I feed about forty to fifty pounds a day to each cow with ground feeds, corn, oats and bran. I put in about six quarts a day of the mixed ground feed twice and all the ensilage they will eat. I will say my silo has lately not been so I could use it, and I am feeding shredded corn fodder now. I consider that the ensilage will give more milk and produce more butter and you can get more actual feed off of an acre of ground for cattle with ensilage than you can get of the shredded corn fodder.

Question: What do you consider the per cent. of loss in shredded fodder?

Mr. Murphy; That will depend on how much moisture there is in it when you are shredding. This year there isn't going to be any. Last year in order to let a man take home his

shredder I was obliged to run at a time when it wasn't profitable, just after a heavy rain. That that was shredded before the storm kept very well, but the other, a great portion of it, spoiled. This machine is a shredder and snapper, not a husker.

Mr. Boyd: In the case where it spoiled, was the fodder stacked before you commenced to shred it?

Mr. Murphy: No, sir, nor husked of course. It was carried right in from the field.

Mr. Boyd: That accounts for the moisture.

Mr. Murphy: Yes, I know that. It was low ground where it stood and both the capillary attraction in the stalk and the water outside acted upon the corn. I could not use my own time with the machine.

Mr. Spies: Did you ever try to put whole corn, the entire stalks into the silo? I read that in New Jersey they have filled a silo in that way and have fed from it for two years, and they claim it came out well.

Mr. Murphy: I never did that. I cut before I put into my silo. I had the feed cutter already to cut my dry corn. My silo is of wood.

Mr. Spies: I read that in France particularly they have been trying brick silos, and the silage seemed to spoil next to the walls. I have thought that it was because the heat of the silage was conducted through the wall and passed up before it was allowed to heat up high enough.

Mr. Murphy: I agree with you, because the best kept ensilage runs up to a very high temperature. The silage must be very thoroughly mixed in the silo. I visited in 1892 a silo in Carroll County, where they were having trouble with the silage that winter. It was a large silo, six or eight squares and we found spots all over moulded six or eight or or ten inches deep, while in other places it was just as nice as I ever saw. We got down on our knees and went to examining some of the different spots and we concluded that the man who had done the pitching had been negligent, there were solid spots and then there were places where the leaves and light parts would be together in another spot instead of mixing the

light and heavy parts of the corn throughout the silo. It settled unevenly and did not drive out the air in the loose parts. The last time I saw him he told me they had been more careful in filling the last time, and had had no further trouble.

Mr. Spies: It seems to me that a steel silo such as has been talked about, built round, would be like the brick silo in respect to spoiling on the outside.

Mr. Murphy: I think it would in our northern climates.

Mr. Stewart: I don't think steel or iron would evaporate water the same as brick, and that might stop the heat from getting out.

Mr. Murphy: You see, as a rule, we put up in the fall and the nights, at any rate, would cool off the steel or iron and chill the inside, so as to prevent the raising of the temperature to cook that feed. The best silage looks as if it had been cooked, and I think it is partially cooked.

Mr. Stewart: Don't you think the farther along we get, the more we come back to the old arrangement in England and Scotland, where they cook all feed? I think that is true myself, but of course, it costs too much to cook it.

Mr. Murphy: I am intending to cook my hog feed. I am going to run a steam pipe under ground from my factory to my hog house, and I expect to cook most of my feed.

Mr. Stewart: I am satisfied that a bushel of grain, well cooked, is as good as a bushel and a half raw.

Mr. Murphy: One of my sons goes to the expense of cooking his feed for his hogs and he says it pays him big. He has not tried it for cattle.

Mr. Spies: Up in Madison county, many of our large dairymen have a steam vat, they mix their feed, put their shredded fodder or cut fodder into the vat and mix in all such feeds as they expect to feed, except, of course, linseed meal. They steam the entire outfit and they seem to have good results. The cows want succulent feed. I doubt whether it is good policy to cook the feed for hogs, but I will cook it for calves.

Mr. Stewart: What is the life of the average wooden silo?

Mr. Murphy: I don't think they last over seven or eight years without relining.

Mr. Stewart: A silo will rot as quickly when it is idle as when it is full.

Mr. Spies: I built a silo eleven years ago and lined it with white pine stock boards, good quality. We have filled it every year and it is still in fairly good condition.

Mr. Murphy: You must be very careful in getting good white pine. Often you put up your boards and you can't see anything the matter with them and pretty soon there are decayed spots.

Mr. Stewart: I know enough about lumber to say that you will not get any more good white pine.

Mr. Murphy: I paid a little more and the lumberman gave me the privilege of sorting my lumber myself. I found it was impossible to get a board without some spot on it.

Mr. Spies: Some people are badly troubled with rats in their silos. In building our silo we run the brick wall flush with the outside of the silo for about a foot down into the ground, then we made an offset coming out further from the silo of one brick and we are not troubled with rats.

Mr. Murphy: In building my silo I dug down in the ground about sixteen inches and put in a stone wall and then I cemented the bottom. I haven't been troubled with rats. The trouble with me was the moles coming up under the surface and that let the water run into the silo, down the stone wall.

THE VALUE OF SHREDDED CORN.

BY JOHN BOYD, ELMHURST.

We all know that corn is the great agricultural staple of the West, not alone because of the general adaptability of the soil, but on account of its immense money value, and desirability for purposes of feeding both man and beast, in fact is the main stay of the western farmer.

There is hardly a farmer in the state, from Cairo to the Wisconsin state line, who does not raise corn as a part of his annual crop, and a great many depend almost entirely upon its cultivation.

To get some idea of the immensity of the crops, I may state that the United States statistics show that upwards of seventy-five millions of acres in this country are devoted to raising corn, that means from eighty to one hundred and twenty millions of tons of corn stalks or fodder, and I venture to assert that the full feeding value of this great annual crop of valuable feed, is not realized on over one-tenth of the product.

Hundreds of thousands, yes millions of tons of valuable feed are annually wasted in the corn producing states, solely from a want of knowledge of the feeding value and how to conserve the corn stalks. When we consider the fact that from thirty-five to forty per cent of the feeding values of the entire corn crop is contained in the stalk, one can form some conception of the annual loss to the farmers in dollars and cents. Many, in fact the great majority of corn producers, have no adequate conception of the feeding value of corn stalks, if indeed, they recognize any value whatever in them. A few who run short of hay habitually put their stalks through a cutter and allow their cattle to pick out what they can find tender enough

to chew without making their mouths sore, in this way saving a small percentage of feed, but the great majority adopt the wasteful method of turning cattle and horses into the fields after the ears have been husked or snapped off.

The cattle in this case eat only what there is left of the leaves and the tops, allowing the valuable part of the fodder (the stalks) to go entirely to waste.

Let the farmer who pursues such methods visit the stockyards in Chicago or St. Louis and study the methods of the beef and pork packers, see how they turn to profit all the waste products of the cattle and hogs they handle, and he will very soon learn that his method pursued in the packing houses would bankrupt the most solvent firm in the business.

To get the best results, corn should be cut and shocked as soon as it is fully matured, because it then contains its greatest feeding value, at no time in its immature state can its full feeding value be obtained, besides, immature corn is not the safest feed for a dairyman to use, especially if he must feed it after fermentation has commenced.

It is only necessary to stand in the shock long enough to become dry enough to husk, then it can be husked by hand and the stalks run through the shredder, or it may be husked and shredded at one operation by the same machine. I prefer the latter, as it saves much of the cost of husking and handling of the crop, but in either case the shredding is perfect. The entire corn stalk by action of the shredder is torn into long shreds, reducing the largest stalks to a fine, soft fodder without any appearance of woody fibre, which is readily consumed by cattle, horses and young stock. The shredded corn goes directly from the shredding machine into the hay barn or floor and if in the right condition when shredded will keep in perfect condition indefinitely without losing any of its properties, or after the lapse of a few days it may be pressed into bales as hay and straw are pressed, and find a ready market in the cities. I have known it to sell, baled, as high as \$9 per ton to parties who knew its feeding value for horses.

Horses will winter on good shredded corn stalks in better condition than they will on grain and inferior hay, and they will do more work than if fed on timothy hay alone.

Shredded cornstalk is a great absorbent, much superior to any kind of straw and consequently more desirable for bedding. Its effect on land when plowed under is excellent, rendering the soil light and pliable.

An acre of corn that will produce from 50 to 75 bushels will also yield from two to three tons of fodder, according to the kind of corn planted, which, if properly handled and shredded, is equal in feeding value to the same weight of timothy hay, in fact it is to be preferred either for horses, milch cows or young stock; not only will they thrive on it but prove more vigorous and healthy.

For several years I put my corn into a silo, but for some years back have preferred to mature the corn in the field, husk and shred the stalks, using the shredded corn stalks as hay, and grinding the corn and cobb together. I believe it to be the best enconmy and to me very much more satisfactory than ensilage. I prefer shredded corn for milch cows to any kind of hay, except perhaps clover hay. It is vastly superior to most other kinds of roughage because it conveys no taint to the milk, cream or butter no matter how much the cows may consume. The keeping quality of the milk and butter from cows fed shredded corn is excellent.

I don't want to be understood, however, as claiming for shredded corn that it is a perfect food, very far from it; notwithstanding that it is nutritious and digestible, it requires to be supplemented with wheat bran, and if obtainable, oil meal and cotton seed meal.

Perhaps it may not seem possible to you that there is such a wastage of valuable feeding material in the present methods, but, as a farmer talking to farmers, I assure you I know by practical experience. I suppose that in time machines will be made to render the process mere play to you, but don't wait for that, shred your corn stalks next year with the best appliances at your command. Follow my advice, my friends, and you may one and

all of you be honored with requests for articles on the subject and really be qualified to write a much better paper than this.

DISCUSSION.

Mr. Judd: Have you ever seen the Milwaukee Shredder?

Mr. Boyd: No, sir, I have used the shredder made at St. Albans, Vt., by the St. Alban. Foundry Company.

Mr. Judd: There is a company in Milwaukee that got out a machine this year that is a self feeder, with a capacity running from 18 to 20 acres a day. It is called the Rosenthal and it does fine work. Two or three neighbors buying it together find it economical to exchange.

Mr. Murphy: That is too much, more than we can get to it.

Mr. Judd: Five teams can handle it all right.

Mr. Stewart: Our farmers divide a good deal on shredding corn or cutting it up. Which do you prefer?

Mr. Boyd: Oh, the shredding, two to one, for the reason that the nutritive value of the corn is in the stalk and not in the leaves or the cobs, and cutting it up does not give you the use of the stalk, the cattle will leave it, and besides that their mouths get sore after they have used it a little while.

Mr. Stewart: Some claim that shredding cuts their mouths more than the square.

Mr. Boyd: I don't see how that can be if it is properly shredded, torn up.

Mr. Murphy: Do you think it really is a fact that the Leaming corn will not sucker? I have raised it and I have not noticed its being any different to other corn. Some seasons it will not sucker but other seasons it will.

Mr. Boyd: I have bought a great deal of seed corn and I have very rarely been able to get seed corn that is true. I save my own seed. Once I raised what I called very fine corn, and

I proposed to sell a portion of that seed to a city house, and I thought I would be sharp and send them a sample, and they said it was very fine indeed, but they could buy yellow corn for 20 cents a bushel; they didn't want any.

Mr. Chubbock (of Missouri): The subject of this paper is of considerable interest to me, as to the farmers in my state. I wish to corroborate one statement made in the paper as to the nutritive value, the feeding value, of corn fodder. I was at one time connected with the Agricultural Experiment Station at Columbia, Mo., and under the direction of Prof. Sanborn, we made some elaborate experiments to determine the feeding value of corn fodder as compared with timothy hay. We found that one ton of corn fodder and one ton of clover hay mixed and fed to cattle, cows and steers, was fully equal in value to two tons of timothy hay, and we also found that there is fully one-half as much value in the stalk as in the grain for feeding purposes. I have fed to dairy cows, using a cutter, and I considered the fodder cut by that machine equal to the shredded corn, at least I had no difficulty in getting my cows to eat up perfectly clean all of the fodder cut up in that way. I supposed when I began that I would have enough left to furnish me bedding for my cows, but I found I was mistaken because they ate it all up, not only in the winter time, but even when they were on as good grass as ever cows were upon, they would come in from the pasture at night and eat a feed of that cut fodder mixed with bran and oil meal every night during the summer, and, of course, in that way I was able to keep a very much larger number of cows upon a given area of grass. I did not shock my corn at all, so that when I speak of corn fodder I mean the whole thing, ears and all. I would take the fodder in the morning and put it in a box, moisten it, mix the bran and oil meal with it and let it soak during the day and then feed it at night, and the cows ate it all up perfectly clean. As part of my crop I grew a large variety of sweet corn and I considered it of more value than other varieties because it did sucker, in that way I produced more ears to the hill; it would send up an extra stalk which would bear an ear, small it is true, but that is what I wanted, and I got more

grain to the acre than with corn that had no suckers. I believe that in our state I can handle my fodder to better advantage and a great deal cheaper in the way recommended in this paper, and get practically as much value out of it as by putting it into the silo.

Mr. Boyd: I do not want to be understood as saying that I do not think well of the silo, because I do think well of it, but I think better of the shredded corn. A gentleman has spoken about the shredded fodder hurting the cows' mouths. I think that is owing to the want of speed in the shredder. These shredding machines will not work well at a slow speed. The one I have requires a speed of 1,500 revolutions a minute to make the shredding perfect. Another thing, it requires less when the corn stalks are a little damp. I tried to work mine first with horse power, but I found it did much better with a steam engine.

Mr. Spies: Speaking of the comparative value of ensilage and corn fodder, I noticed a bulletin, issued, I think, from the Indiana Experiment Station, showing where they took a great deal of trouble to determine the value of an acre of corn placed in a silo and an acre of corn shredded, and fed in that way, of course, according to approved methods, and they came to the conclusion that an acre of corn placed in the silo was worth \$10 more an acre than when fed in the shape of fodder to cows.

Mr. Boyd: Prof. Plumb and Prof. Sanborn came to very different conclusions.

Mr. Judd: The Madison Experiment Station of Wisconsin gives it entirely different.

Mr. Boyd: You see at the present prices \$10 an acre for corn would be an "ungodly" difference. The farmer cannot afford to be an experiment station, he cannot go into any such details as that. We can only judge from general appearances. I prefer the shredded corn because I think I do better with it. Now, I may be mistaken, but the Experiment Stations are for the purpose of giving us that information, the scientific part of the information.

Mr. Judd: I want to ask you, Mr. Boyd, don't you consider that your experience and your conclusion that this was a better

system of feeding, is better evidence than it is to have someone over in Indiana tell you something else?

Oh, yes, assuredly.

Mr. Judd: That is why I got up before you yesterday and told you that I considered my system far superior to the one I was using previously, because I am the man that runs the milk pail everyday, I am the man that takes in the money from my herd and if I get more money, more pounds of milk from that system of feed, I claim that I know from my own experience that it is the superior way and I don't think it depends on some experiment station to tell me about the other way, so I would consider Mr. Boyd's experience far superior to any experiment station that takes a few cows for a short time and carries on an experiment and gets a general result. I think Mr. Chubbock made a statement that ought not to go on record. He said he considered from an experiment carried on by their Station that a ton of clover hay and a ton of corn fodder were equal to two tons of timothy hay. Now, I think that any farmer will admit that one ton of clover hay is equal to two tons of timothy hay. Any of us can prove that corn fodder is worth twice as much as timothy hay. Indeed, I say that a ton of clover hay and a ton of corn fodder are equal to four tons of timothy hay. I can't comprehend that statement.

Mr. Chubbock: That was what the figures of the Experiment Station sustained. It is not my opinion at all.

Mr. Monrad: I am sorry to hear friend Judd speak that way about the Experiment Stations. They carry on experiments that it is impossible for the farmers to carry on, they don't know how to do it in the first place. Feeding experiments are very difficult, there are so many elements entering into it that have to be considered. With all due respect to Mr. Judd's experience on the farm, I must say that unless he was there all the time, and carried on careful experiments, he would be like the farmer's wife that told me, when I suggested the use of the separator, that she was getting all of the milk from the cream. I said, "How do you know it?" "Why, I left that skim milk setting twelve hours longer and not a bit of cream raised on it. "Now,

I tested that skim milk and there was .7, pretty nearly a pound of butter left in that milk. That is the way with most of our so-called practical experiments on the farm. Of course, they do make mistakes at the experiment stations, but they are doing very difficult and valuable work.

Mr. Judd: I have great respect for the experiment stations, but when a man like Mr. Boyd, who is just as capable of carrying on an experiment as any experiment station.

Mr. Boyd: Oh, I disclaim that.

Mr. Judd: Even Hoard's Dairyman, the best dairy paper published, appreciates that it is much easier to sit down and figure out a theory than to go right into your own barn and follow it up. They often arrive at results at these experiment stations that we cannot harmonize with our own practice. Of course, most of them are all right, but when they say that a ton of clover hay and a ton of corn fodder do not bring any better results than two tons of timothy hay, it seems to me there must be some condition that they did not take into consideration.

Mr. Spies: I notice that some of the speakers here do not realize that they live in different altitudes. Mr. Judd spoke of the corn standing in the water on level ground. You must remember we have an open winter here compared with what it is up at Dixon and when that corn stands out in this moist air, it degenerates, the stalks act like a sponge and become loaded with water. We can't leave our fodder out in the field as they can in the northern part of the state. Maybe over in Missouri the ground is higher than here on our level prairies. That is the reason that I have to resort to the silo and my experience has been that the silo is the place where I could keep feed with the least deterioration.

Mr. Boyd: There is no excuse for leaving your corn fodder in the field all winter. What would you think of a farmer who when he harvested his corn would throw the ears on the ground and leave them there and carry the stalks into the barn? You would think he was a fit subject for a lunatic asylum but that is exactly what lots of them are doing when they leave the corn stalks on the ground. We saw lots of corn as we came along

down here, the ears had been snapped off and the stalks are standing out there to-day, and they never will be made any use of, except to plow them under, and they are not in the best condition even for that. It would pay them to shred them to plow under, if nothing else.

Mr. Murphy: I find that with us some have been running their fodder through a threshing machine and calling that shredding. The first shredders that came into our section had some kind of a cylinder, such as the threshing machines have, across the teeth, rigid. The new machine has brought us far better shredded corn fodder. I have seen some cases where the corn would not be torn apart for at least eighteen inches long, and I think that would make a cow's mouth sore. It should be torn up fine and then there will be no danger of making a cow's mouth sore as there is with cut fodder. I found I had to set the fodder cutter to cut only a quarter of an inch long in order to satisfy both the cows and myself. For the silo it should be about three quarters of an inch. I have an idea that there will be less danger of spoiling with moisture on it to put it into the silo than the open bin.

Mr. Boyd: I think that the trouble in putting in shredded corn is that it should not be packed down. It is the reverse of the silo. It should be thrown in as you throw in hay and allow it to settle itself. It will heat up some.

Mr. Newman: I want to get this audience to grasp the idea that the value of corn fodder is equal to the value of the corn and when you men of Southern Illinois realize the millions of dollars of the corn crop going to ruin each year and how much you will save to the state by saving it, you will contrive some way to save it in the silo, or by shredding it.

Mr. Spicer: I notice Mr. Boyd spoke about husking corn and then grinding it and then you give a kind of formula adding bran and linseed meal and cottonseed meal. What do you do with the corn that you grind?

Mr. Boyd: Feed it to the cows and the hogs and the horses. We grind the whole cob.

Mr. Barber: There are some seasons in this part of the

state that the chinch bugs suck all the sap out of our corn, so that we consider the stalk useless. If we had some way of defeating them, then we would have a chance to do better.

Mr. Boyd: Your chinch bugs come from raising wheat. We don't raise any wheat because it is unprofitable.

Mr. Wildman: We didn't raise very much wheat this year, but still we raised a good many chinch bugs.

Mr. Blessner: It seems to me that I have seen some fodder left out in the fields up north sometimes.

Mr. Boyd: That is very true. We have shiftless fellows all over the state.

Mr. Soverhill: Speaking of clover hay in these experiments I want to say that I think there is a great deal of difference in cutting it early, as soon as it is fairly in blossom. I think there is twice the difference in value to what there is later on.

The Chairman: Don't you find it hard to secure it when it is so green, aren't you busy getting in your grain at that time?

Mr. Spicer: I let everything else go and get the hay in while it is right.

Mr. Newman: We in the northern part of the state started in along in the early seventies and commenced to feed corn fodder, now I do not think there is a farm in the Fox River Valley but what every spear of corn that is raised is cut up and fed. On my little farm of 180 acres, I carry fifty cows, some young stock and eight or ten horses, pigs, etc., I can make better milk on my roughage, corn stalks than I can when I start in to feed hay in the spring. I do not feed hay to the cattle unless I run out of corn stalks. There are farmers all over the state who leave their corn standing out and there are farmers all over the state that have lots to learn yet before they will begin to make money, and that is what we are all after. I think that you people down here, if you will take more pains and save the roughage and feed it and sell your hay and buy other feeds, you will make money.

Question: How about feeding this corn fodder to horses, steers, etc.?

Mr. Boyd: It is better for horses than any kind of hay. I

say that on the responsibility of other farmers besides myself. I know of one gentleman who wintered forty-eight head of horses three years on shredded corn stalks and they have done better than they did on hay. It will prevent the heaves if it won't cure them.

Question: About what is the proper ratio at which to feed bran and linseed meal, and your fodder?

Mr. Judd: Sixteen pounds of bran to fifty pounds of fodder.

Mr. Newman: The common feed up in the Elgin district is one third corn, one third oats, one third bran, all ground. We fed our corn stalks whole for a while and then we got a cutter and we liked them much better cut. A couple of years ago we got what is termed a "thresher," which I believe is as practically the same as a shedder, and that is better still. We believe we can get more product to the acre by partially helping the cow chew up the roughage. We don't start in in the fall and shred all our fodder and put it in the barn, or in stacks, but we do it about once a week, so that we don't feel the expense.

Mr. Stewart: The reports of some of these experiments are put out very blindly and we get wrong impressions. Now, I would like to ask Mr. Chubbock, isn't there as much virtue in feeding clover hay to cows as in feeding timothy hay?

Prof. Chubbock: That experiment was in feeding beef steers and it was in reference to the gain, the number of pounds that they would add to their weight, not feeding dairy cattle at all.

Mr. Judd: Now, that is a complete solution of the whole problem. I will admit that a ton of timothy hay is equal to a ton of clover hay for beef, but we thought Mr. Chubbock was talking about dairy cows.

Mr. Chubbock: In determining the nutritive value of feed it is usually applied to gain in weight. That is the usual application of the term. I made that statement in regard to that experiment in support of the statement as to the value of corn fodder, the feeding value of corn fodder, and I assumed that or-

dinarily speaking, when we are talking of the feeding value without specifying particularly that we referred generally to its ability to add to the animal weight.

THE ADVANTAGES OF DAIRYING.

J. E. SPICER, EDELSTEIN, ILL.

Mr. President, Ladies and Gentlemen:—

I suppose all men, both old and young, when about to enter upon the pursuit of farming, use, or try to use, their best judgment as to what branch, or branches, of that business is best calculated to carry out the object they have in view, whether that be for pleasure, health or profit.

If purely for pleasure one would naturally take to that branch or branches of farming, which he or she would most delight to see developed without much thought as to the financial outcome of the undertaking. But as so few who are able to do so are inclined that way, and my own experience, of over thirty years' having had more to do with the financial, rather than the purely health and pleasure part of the business, I will devote what little time I may occupy mainly to that side of the question.

Not that I would for a moment underestimate the real and all important value of health and pleasure, for I fully believe that both may be as honorably and effectually secured in the dairy as in any other business, and with these two stricken out our lives would be but drudgery and a howling wilderness (so to speak) for us. However much people may differ as to what

good health and happiness really are, it should be the privilege, if not the duty, of every one to get as much of both as possible from day to day, not only for ourselves but for all with whom it may fall to our lot to have to do.

It has been well said that "We pass this way but once."

Some thirty-six years ago, when I commenced doing business with the farmers of the central part of this state, I soon discovered that those farmers who always had ready money to meet their obligations were most sure to be the men who, in some way were condensing the products of the soil into beef, pork, horses, cattle, butter, cheese, wool, etc., thereby greatly reducing the expenses of shipping the products of the farm to some distant market, and the farmer who did not have ready money with which to meet his obligations was most sure to be the man who raised grain and hauled the same, with all its bulk and weight, to market; that market often being to the more prosperous neighbor, who through some of the means above mentioned, converted that grain into marketable products of very much less weight. He often loaned the grain-man money, and took his grain in payment, and made more clear money in the transaction than the banker would have done by loaning the money at twenty-per cent interest.

Our honored secretary has asked me to present some thoughts for your consideration on the Advantages of Dairying. I thank him for the honor, and ask your patient consideration of what I, in my clumsy way, may have to say, for it will consume but a small part of as much of your valuable time to tell you what I do know about this business as it would to tell you what I do not know.

In the first place, we all understand that for a man to succeed in any branch of business, or industry, he must have some adequate adaptability, and inborn liking for that particular work. This is especially true in connection with the dairy business, for a slovenly, slack, happy-go-easy kind of a man, who only wants six to eight months' work in the year, will be out of place, and the ordinary advantages of dairying do not lie in that man's pathway, and the business has no use for such a man, nor the man

a real use for it. There are many essential details which must be known and provided for, and carried into every day's work, that such a man will neither do himself, or require any one else to do for him. Under such circumstances the disadvantages would surely overbalance the advantages, and inevitable failure sooner or later, stare that man in the face.

But the faces before me do not represent men of that character. I think they are not here; they would not go out of their tracks to learn anything new that had work behind it; they would not read the best dairy paper in the world if it was their privilege, free of cost. But should there chance to be, in this audience, a lazy person who has any connection with the dairy business I venture the assertion that he or she has not long been in that business, and dependent upon it for a living. The so-called butter, made by such people, overload the markets with a kind of—what shall I call it?—well, you name it, that sells at a price that the cows, if they could speak, would disdain, for their share of the work. But to the man or woman who loves the cow and the work connected with dairying, and is willing to learn all truths, not only for truths sake, but to put them into practical operation, I will say:

First.—That I believe all land, however rich and productive, could be benefitted by pasturing, and properly using the fertilizer from the cows, calves and hogs, (the latter very proper adjuncts in the dairy business and essential to best financial results.) Many worn out farms with light sandy soil have been wonderfully reclaimed, and made productive through the dairy system of farming. I have had no practical experience with that kind of soil, but many others have, and report good results. I have often thought of the remark frequently made to me by a good, old neighbor, more than a quarter of a century ago, when we first bought and moved to our present home, (he has long since been called to his long home). With almost pitying tones he would say: "John, it never will pay you to hire help to haul so much manure." I thanked him for his kind advice, as I was young, and had reverence for his age, but I said, "Time will tell." And it was not many years till the manure wagons ran

quite regularly on that man's farm. He only needed an object lesson to teach him that it would pay to hire help to haul manure, even on to that fertile prairie soil. One half (eighty acres) of our present farm had been rented and cropped, and pretty well seeded with cockleburrs. I was at that time renting that land, and by the time we had those burrs thoroughly subdued this good neighbor had made a perceptible showing with his. We all know that it is less work to raise an acre of corn that will yield seventy-five bushels than one that will produce only twenty-five bushels; so aside from "cribbing" the crop, we have fifty bushels to the acre that has really cost less than nothing to raise. If a man can afford to raise the lesser crop for thirty cents per bushel he can better afford to raise the larger crop at ten cents per bushel. One had better pay \$12.00 rent for the use of the land producing seventy-five bushels than \$4.00 for the twenty-five bushels. The same rule holds good, in a great measure, in estimating the real value of the land itself. The benefit to the land used for dairy purposes will go a long way towards paying the expenses necessarily attached to the dairy business. I believe with the introduction of the silo, in connection with dairy farming, that most land could in a few years, be made to carry more than double the amount of stock formerly kept.

Second.—I believe it to be a fact that for the last twenty years with the average man dairy farming in this state, when rightly managed, has been second to no other branch of that business, either in magnitude or profit; but it is also a fact that a large per cent of the butter made in this state has been made at a dead loss, owing to its inferior value when put upon the market. To make dairying most profitable one must learn the business "from knuckle to thumb," by his own experience and observation, and a close study of the experiences of other people who have made that business a success by reading the best dairy books and papers, using his own best judgment and discretion in applying their teaching to the necessities of his own particular business. It may take much reading to learn a little, but that little may be worth much to us.

Third.—The products of the farm can more quickly be

turned into cash through the dairy than by any other means of concentrating that product, and furnish ready money every week, or month, with which to meet present needs, and occasionally pay off an old mortgage, or add to the bank account. With the present machinery and lightning way of doing business feed can be reduced to butter in thirty-six to forty-eight hours, and turned into cash.

The creamery and cheese factory are a Godsend to many localities, greatly lessening the labor and the details connected with farm, butter or cheese making, with decidedly better results, very much of which is owing to the better quality of the goods produced. But even these often fail for want of proper management and support. Experienced, well balanced heads must be had to insure success. Of all the branches of farming, this is the last to successfully run itself. As "eternal vigilance is the price of liberty," so "eternal vigilance is the price of a good dairy product."

The fourth advantage of dairying comes to those engaged therein by the necessity of constant application of their powers of brain and brawn to the business, establishing habits of nearly constant industry, which is a decided advantage to all men, and better fits them for all other duties in life. I refer you to the most excellent address of Mrs. Mayo, yesterday P. M., in support of this advantage.

Fifth. There is a moral side to the business which has hitherto been looked upon with no little suspicion, and the source of much anxiety and trouble. But since the introduction of the Babcock test, and the producer receiving pay for his milk according to the butter fat contained therein, the inducements to be dishonest by robbing the milk of more or less cream, or adding water thereto, have vanished, and the man who presumes to beat that test is about as successful as the man who put water in his maple sap that he might thereby obtain more sugar. The aggregated large amounts of poor butter put upon the market I believe largely responsible for the introduction of oleo and butterine. Their advocates never intimate that that product is better than good butter, but better than most "country butter;"

therefore it is often sent out in irregular shaped rolls wearing the country butter dress, and the people, (and there are thousands) who never know what good butter is, buy it for butter. People that have ever eaten real good butter for any length of time will not use a counterfeit unless extremely poor, or too averitious to pay for the genuine.

And now we have the Process butter, said to be made from poor country butter by some secret process, with a chemist, I suppose, as its originator.

Well, what next. Perhaps a little confession on the part of the writer of the foregoing is now in order. So I will tell you (of course you can all keep a secret). During the past few weeks he had thought of several good things in favor of the advantages of dairying, and had made a minute of them as he thought, in pretty fair shape, but as good, or bad, luck would have it, one day it stepped out; perhaps through the waste basket, and the confession is due this audience for the hasty manner in which he has been compelled to write what is now left for your consideration.

DISCUSSION.

A Member: The speaker has made the statement that oleo was as good as country butter. Now, I claim it is not as good as any butter, good, bad or indifferent.

Mr. Spicer: I don't know about that. My statement was that the poor butter was largely responsible for the introduction of oleo, because the oleo people never could have got on their

feet only as a fraud and an imitation, they could not have got on their feet or done any business at all only to take the place of this poor butter.

The Member: Inevitably it has taken the place of it in appearance, while the inherent quality is not there.

Mr. Spicer: That is true. I was arguing all the effects that have come about through these people who have made poor butter, and that is one of them. They did it ignorantly and I don't suppose they will go to the lower place for it, but, unfortunately, we are responsible in a great measure for what we don't know, as well as for what we do know.

The convention was addressed by several members bringing cordial invitations from various points in the state for the Association to hold its next meeting at such points. Mr. Brayton urged the attractions of Sparta; Mr. Spies wanted them to come to Highland; Mr. Tivy thought St. Louis would be a pretty good place and Crete and Peoria were also mentioned.

On motion of Mr. Boyd these invitations were all referred to the Board of Directors.

The report of the committee on nominations was called for and submitted by the chairman, Mr. Welford, as follows:

President, GEO. H. GURLER, DeKalb.

Vice President, JOS. NEWMAN, Elgin.

DIRECTORS.

JOHN STEWART.....	Elburn.
A. G. JUDD.....	Dixon.
S. G. SOVERHILL.....	Tiskilwa.
R. R. MURPHY.....	Garden Plain.
R. G. Welford.....	Red Bud.

Signed, R. G. WELFORD.

JOHN STEWART.

H. H. HOPKINS.

On motion of Mr. Judd, the secretary was instructed to cast the vote of the association for the officers named, which was done, and the officers named in said report declared the duly elected officers of the association.

President Gurler: I feel highly honored to think that I have been selected the third time as president of this association. At the same time I don't believe in a third term; there are many men in this association able to take up and carry intelligently through the work of its programme. There are men who have a better control of oratory by far than I have; there are men in this association who have all the qualifications that are required of a man to fill this office, and qualifications which I realize that I am lacking, but, as it is your wish, I will serve you and I will work first, last and all the time in what I consider the best interests of this association.

The secretary then announced that there had only been one entry for the following essay premiums, and that all had been won by Mr. W. R. Hostetter, Mt. Carroll.

HOW TO SELECT DAIRY TINWARE.

(Premium of Six Seamless Neck and Cover Milk Cans, worth \$12.00, offered by Chicago Stamping Co., Chicago; won by Mr. W. R. Hostetter.)

To the dairyman this is an important question. It seems like an easy one but it is not. Our markets are flooded with cheap and worthless tinware. Nearly every town has a store called "The Fair," "The Racket," "The Ten Cent Store" or

some similar name where tinware can be bought for very little money. Found in such places it is almost worthless to the dairyman. There is probably not one dairyman in ten that knows anything about the manufacture of tin and would not know whether charcoal tin was first, second or third grade. We have bought dairy tinware for the last twenty years and believe that the best way to select it is to go to the most reliable hardware man you know and tell him what you want. Tell him that you want the goods purchased of a reliable firm that have studied the wants of the dairy trade. My milk cans, pails, strainers, etc., made by local tinner, have been very unsatisfactory. A reliable firm will study the demands of the trade and adapt the goods to the purpose. They can not afford to send out an inferior article. Your local dealer in most cases is perfectly reliable but he can not make you as good can, pail or vat as a large manufacturer, because he cannot afford to spend the time necessary to know all the little details that go into the making of a first-class dairy article. He can not afford the necessary tools and machinery on account of the small number made, neither can he afford to carry sufficient stock of the best material, for the majority of people buy cheap tinware and will do so until they are educated to the fact that the best is the cheapest. Most dairymen should and can know something about the different grades of tin but they cannot expect to be experts.

In buying tools, farm machinery, wagons, carriages, in fact almost everything that the dairyman uses he must depend almost entirely upon the reliability of the manufacturer.

There are firms making a specialty of dairy tinware that are perfectly reliable and turn out goods upon their honor.

Let the dairymen go to such firms or their agents and offer to pay a fair price and they will obtain the very best goods that can be manufactured, and the question of "how to select dairy tinware will be solved.

This paper was read by Mrs. Kelly and Mr. Monrad regretted that no stress had been laid on seeing to it that all soldering was done perfectly smooth leaving no crevices for coagulated milk and bacteria to hide in.

DOES IT PAY TO FEED OUR DAIRY COWS GROUND FEED?

(Premium of a scientific new style Sweep Grinder valued at \$35.00, offered by Kingman & Co., St. Louis, Mo.; won by W. R. Hostetter.

It is difficult for a person to prove a question that is self-evident or at least seems so. It might seem foolish to try to prove that it pays to feed our cows at all, but it is really a fact that some farmers seem to figure to see how little they can feed their cows and have them live without regard to profit, instead of how much profit can be made by judicious and liberal feeding. So long as the former class of farmers exist it will be necessary to present some arguments to prove things that are self-evident to the latter class.

After feeding cows for twenty-five years we can safely say that the only person who can get along without ground feed is the farmer who has a silo and he can not get along without it if bran, shorts, and oil meal are considered ground feed. Even the man with a silo must grind his oats if he wants to get its value.

Although what the majority of people do may not always be the best thing to do, we may consider in a case of this kind where it is matter of amount of profit that the majority would probably be in the right.

Among our acquaintances the successful dairymen invariably grind their corn and oats and I think there is no doubt but this is true everywhere.

We know of a few dairymen who feed shock corn in the yard but this is only part of the ration and they always have hogs in the same yard and feed cows ground feed in the barn.

Oats are one of the best grains to feed milk cows, but if fed whole fully one-half of it will be lost on account of the cows' in-

ability to digest it. It takes very little figuring to prove that it pays to grind oats when this is the case.

We think the loss on corn is fully as much as on oats and in fact more if the corn is shelled; of course with corn part of the waste can be recovered by allowing hogs in the stable or on the manure pile if it is not hauled directly into the field. But we claim that the extra work required to keep a barn clean, where hogs run in it, would pay for the grinding.

One of our experiment stations has proved by experiments that are perfectly reliable that the cob of an ear of corn when ground with it, has the same value per pound as the corn itself. This would give us a gain of fifteen pounds on every bushel of corn, or twenty-five per cent more in weight which would more than pay for grinding, to say nothing of the increased digestibility of the feed.

Another reason it pays to grind oats and corn is that it is much better to feed them with bran and shorts and if not ground they can not be mixed. They are too rich to be fed alone, especially corn.

When a farmer has his own mill, the cost of grinding is very small and grinders are so cheap that every farmer can afford to have one. With the improved grinders on the market a farmer can grind his grain while he would be hauling it to the mill with no more work for the horses and very little more to himself.

Ground feed is much more palatable to the cow; to prove this it is only necessary to place the two kinds before her.

It is cow nature as well as human nature to be grateful, and try and repay those who endeavor to please us. It is certainly true that a man's affections can be gained through his stomach and it is equally true of the cow. The affectionate and contented cow is the one that makes the profit and in no other way can we make her contented and affectionate better than by feeding her ground feed and it will pay a handsome profit over cost to grind her feed.

THE EFFECT OF NEATNESS IN FARM SURROUNDINGS ON THE QUALITY OF THE BUTTER.

(Premium of 20 rods of their 58-inch No. 5 Woven Fencing valued at \$11.00, offered by I. L. Elwood M'fg. Co., DeKalb; won by W. R. Hostetter.)

On first thought a person would naturally say that the farm surroundings had nothing to do with the quality of the butter, that if the stables were clean inside, that if the dairy utensils and dairy-room were clean and the butter maker neat and clean that the surrounding influences could have no possible effect. But in assuming the above we assume conditions that do not exist. A clean barn with dilapidated doors, rickety fences and filthy barn yard does not exist.

Neither does a neat and clean butter maker exist where the slops are thrown down by the door and the poor fences allow the chickens, ducks, geese and pigs to eat every blade of grass in the front yard. The fences, the lawn, the trees, the out-buildings have a direct influence on the butter.

Good and uniform butter can not be made on a farm with poor fences, cows that will occasionally get through fences into grain fields, will worry continually and the best quality of butter can not be made from them. Untidy and dilapidated out-buildings always indicate neglect and there is no neglect without decay, which means bad odors and the breeding of injurious bacteria which fill the air and fall into the milk and infest every nook and crevice. There is nothing will absorb bad odors and breed bacteria more quickly than milk and the bad effects are seen in the butter.

We might mention the effect of badly kept barn yards and hog pens upon the wells that are quite a distance from them and how such water will not only make the butter that is washed in it unfit for food but will injure the milk of cows that drink it.

To more fully illustrate the good effects of neat surroundings

we have mentioned some of the evil effects of untidy surroundings.

It has been said that you can tell the character of people by their surroundings; that the general appearance of the home indicated what the people were that occupied it. We do not think it necessarily follows that good butter is made on every farm that is neat and tidy, for skill, time and proper conveniences are also necessary. But we do believe that every farm where fine butter is made is neat and kept up in good shape. That there will be good fences, neat house and out buildings, comfortable stables, neat barn yard and well kept lawn. Fine butter can come from no other place, any more than misery could come from heaven or happiness from the lower regions.

ADDRESS.

BY GEORGE W. LINN, CHICAGO, ILLS.

It is an unexpected pleasure that I am here. I have been at Rockford all the early part of the week, trying there to do work that would be beneficial to the dairymen and their interests. I am glad to be here because we are all interested in the same things. I have been a long time interested in trying to secure legislation in the interests of the dairymen and now I want to see that law enforced. I am so much interested in this question that it seems to me that it should be pushed to the front at every such convention, although one has only to sit here and listen awhile to realize how many other important things are connected with the industry.

You all know something of the struggle that we have had to secure even the position that we have attained. We did not secure the law that we wanted, but we have something that is of great value. At any rate we demonstrated the fact that the legislators, and even the governor did not feel at liberty to go contrary to the wishes of the people in the country. The senators and representatives from Chicago were almost unanimous in their opposition to any legislation which favored the farmers, but the country representatives, when they learned the wishes of their people, were willing to be guided thereby and all that had to be done was to convince them what was expected of them.

The law covers the manufacture and sale of the goods, but gives us no state officer to enforce the law and no appropriation to assist in its work.

In Iowa, Wisconsin, Michigan and Ohio and in all of the eastern states, they have been provided with a dairy commissioner and a special appropriation has been made to meet all the expenses in the enforcement of the law. But we are determined to go on and to get the whole benefit of the little legislation we now have. We shall have to go before the next Legislature and ask for an amendment to the law that will provide for a dairy commissioner, and an appropriation to carry out the work.

You will realize that this will not be easy to do when you understand that there have been thirty million pounds of this product made in Chicago in one year. We have raised considerable by private subscription to help in this work. We have had three men indicted in the criminal court. The constitutionality of this new law was attacked in an argument before three judges of the superior court. Our lawyers had everything in their favor, having favorable decisions from the supreme courts of ten or twelve different states.

The case was argued before these three judges and we are expecting the decision this week. Of course, we cannot tell how it is coming out but we hope for the best. There has been no adverse decision in any state upon this point, which is the main one depended upon.

Mr. Chubbock: We have gone through considerably the same experience with our legislature in Missouri. At our meeting of the dairymen last week, steps were taken to secure the incorporation of our State Dairy Association with a view of securing from the Legislature the enforcement of the law which we now have, putting such enforcement in the hands of the association.

Mrs. Mayo: I want to tell you how we got our dairy and food commissioner in Michigan. I am not a politician but I am the wife of a politician, and I have to stand right behind that man and I am obliged to listen to all the arguments that he has to present.

We have been working hard for that law. The Grange is strong in Michigan and it is largely through the influence of the Grange that we have to-day a law in regard to pure food and we are fortunate in having a very strong man as Dairy and Food Commissioner. Our first man didn't amount to anything, but now we have Mr. Grosvenor, an earnest, persistent man, and he isn't afraid of anybody, not the governor or the whole state of Michigan or any political influence that may be brought to bear on him, because he knows that behind him is the great constituency of the farmers of the state of Michigan and under such circumstances, these legislators are putting their ears to the ground and listening for something

He is vigorously prosecuting offenders. He is reading up, he has sent out inspectors to all the farmers around the country that are selling their milk in the cities, submitting them to rigid examination, making reports which stand on the records and which a man don't like to see unless they read pretty well. He is going after the slaughter houses where animals are killed and put on the market, examining into their condition. There ought to be in every state a sufficient appropriation made to carry on this work. Think of the amounts that are appropriated for all sorts of things that are of no earthly use to us farmers. We must look after our own interests and elect men to these positions that we can tie to every time, not to tie to before election, but tie to when the votes come to be counted.

Mr. Soverhill: Mr. Linn, what success have you had in getting funds from the different creameries through the state to aid you in enforcing the laws?

Mr. Linn: Our success has not been very flattering. I was instructed to send out to every creamery in the state which I did. We had a lot of circulars printed and we sent them out. Some responded very nicely, but I didn't get back as much money as I expended in trying to get it. During the session of legislature, when we asked the creameries for five dollars apiece, they responded pretty well and that money was used in sending literature throughout the state to let the people know what we wanted them to do, which was to bring their pressure to bear upon their senators and representatives. Then we tried to get something from the patrons of the creameries and there it seemed to stop.

Mr. Soverhill: I find a good deal of difference in different locations; some have been very willing to respond.

The Chairman: I think that the trouble lies largely with creamery men in not giving that matter their attention. I believe that if they would push it properly, we could collect from twenty-five per cent. anyway of our patrons.

Mr. Welford: I had a little something to do in raising subscriptions and also in keeping our representative in line with us. He made some promises before he was elected and we held him to his promises, and he staid by us in good shape.

Adjourned to 1:30 P. M., same day.

The convention met at 1:30 P. M., same day.

The president in the chair.

Secretary Monrad presented the report of the judges on the butter and cheese scored by them as follows: also announcing the takers of the prizes.

30. J. H. Shurman	Bartelso	H. Shurman.....	46	24	10	10	5	95
32. H. R. Duell	Franks	Palace Car Creamery Co.	47	24½	10	9½	5	96
33. A. C. Winter	Waterman	A. C. Winter	47	24½	10	9½	5	96
34. Frank Clarke	Fair Haven	J. Newman Co.	46	25	10	10	5	96
35. F. L. Metzger	Millstadt	Star Creamery Co.	48	24	9	10	5	96
36. M. M. Lewis	Victor	F. P. Rickey	46	24	10	10	5	95
37. Geo. E. Waterman	Garden Prairie	Geo. E. Waterman	43	24	9½	10	5	96½
38. Geo. A. Cutler	Belvidere	Geo. Reed	45½	24½	10	10	5	95
39. G. Boesenberg	Lanark	J. Newman Co.	46½	24	10	10	5	95½
40. W. Carbough	Nursery	J. Newman Co.	46	24½	9½	10	5	95
41. Anton Buehler	Bernes	Interstate Creamery Association ..	47	24½	10	10	5	96½
42. W. H. Smith	Sandwich	W. H. Smith	46	24½	10	9	5	94½
43. Henry Nagel	Prairie	H. Nagel & Co.	45½	24	9½	9½	5	93½
44. K. B. Carpenter	Thomson	N. Newman Co.	47½	24½	10	10	5	96½
45. H. Baetje	Smithon	Smithon Creamery Co.	47½	23½	9½	10	5	95½
46. O. Schultz	Waterloo	C. W. Wait	47½	25	10	9½	5	96
47. C. W. Wait	Union, McHenry Co. ...	Fountain Creamery Co.	46½	24½	9½	10	5	96½
48. J. H. Complimentary	Red Bud	C. W. Wait	47½	24½	9½	10	5	92
49. C. L. Weihe	New Minden	R. G. Welford	43½	24½	9	10	5	94
50. J. Munier	O'Fallon	New Minden Creamery Co.	46½	23	10	9½	5	96
51. C. H. Woodard	Kaneville	O'Fallon Creamery Co.	46½	24½	10	10	5	96
		C. H. Woodard	46½	23½	9½	9½	5	94

DAIRY BUTTER SCORES.

Name.	P. O. Address.	Flavor.....	Grain.....	Color.....	Salt.....	Style of Package.	Total.....
		STANDARD.					
		50	25	10	10	5	100
R. A. Bloomfield.	Mt. Sterling.....	44	24	9½	9½	5	92
S. S. Merritt	Henry, Marshall Co.....	46½	24½	10	9½	5	95½
Jas. H. Simpson..	Ruma, Randolph Co ..	43½	24	9½	10	5	92
S. W. Peak.....	Winchester.....	44	24	9½	10	5	92½
A. Spoenemann..	Oakdale.....	45½	24½	10	9½	5	94½
R. A. Patton.....	Hanna City	44½	24½	10	10	5	94
J. P. Smith.	Freeburg.....	44½	24	10	9½	5	93
Geo. R. Wilson...	Monmouth.....	45½	24½	10	10	5	95

CHEESE SCORES.

Name.	P. O. Address.	Flavor.....	Quality	Texture.....	Color.....	Salt	Total.....
		STANDARD.					
		30	30	20	10	10	100
J. A. Biddulph	Providence.....	28	28	20	10	9	95
S. G. Soverhill.....	Tiskilwa.....	28	28	18	9	9	92

THE ILLINOIS PURSE.

ONE HUNDRED AND THIRTY DOLLARS PRO-RATA PREMIUM FOR ALL
MAKES OF BUTTER SCORING 95 AND ABOVE—DONATED BY

THE DE LAVAL SEPARATOR CO.

Manufacturers of the matchless Alpha Separators, 74 Cortlandt
St., New York, and Canal and Randolph Sts., Chicago—\$20.00.

A. H. BARBER & CO.

Produce Commission, manufacturers of Dairy Apparatus and
Refrigerating Machines, 229 South Water St., Chicago—\$10.00.

CORNISH, CURTIS & GREENE MFG. CO.

Ft. Atkinson, Wis., manufacturers of Dairy and Creamery Ap-
paratus—\$10.00.

CREAMERY PACKAGE MFG. CO., CHICAGO

Manufacturers and dealers in Dairy and Creamery Apparatus
and Supplies—\$10.00.

DIAMOND CRYSTAL SALT CO.

Manufacturers of "The Salt That's All Salt." C. F. Moore,
President, St. Clair, Mich—\$10.00.

GENESEE SALT COMPANY

Manufacturers of "The Salt that Wins the Sweepstakes,"
Mercantile Exchange, New York, and Ogden Building,
Chicago—\$10.00.

WORCESTER SALT COMPANY

Manufacturers of the Salt used by the winner of the Diamond
Medal—\$10.00.

THE CHICAGO STAMPING CO. CHICAGO

Manufacturers of Milk Cans and Dairy Tinware—\$5.00.

DAIRY MUTUAL INSURANCE COMPANY

W. S. Furnas, Secretary, Lisbon, Iowa—\$5.00.

JOHN BOYD, 199-203 Randolph Street, CHICAGO

Milk Dealers' and Dairymen's Supplies—\$5.00.

THE THATCHER MFG. CO., POTSDAM, N. Y.

Manufacturers of Pure Annatto Butter Color—\$5.00.

FRANCIS D. MOULTON & CO., NEW YORK and CHICAGO

General Agents for the celebrated Ashton & Higgins Dairy
Salt—\$5.00.

I. L. ELLWOOD MFG. CO., DeKALB, ILL.

Manufacturers of Wire Fencing, Wire Nails, etc—\$5.00.

SCOTT VALVE CO. CHICAGO

Marsh Steam Pumps for MILK and other duties—\$5.00.

CHAMPION MILK COOLER CO., CORTLAND, N. Y.

Manufacturers of the Champion Automatic Milk Cooler and
Aerator—\$5.00.

CHR. HANSEN'S LABORATORY, LITTLE FALLS, N. Y.

Manufacturers of Rennet Extract and Tablets, Cheese and
Butter Color—\$5.00.

ELGIN BUTTER TUB CO., ELGIN, ILL.

Manufacturers of and dealers in Butter Tubs, Cheese Boxes and
Creamery Supplies—\$5.00.

The donors of this purse will be pleased to send their cata-
logues and price lists, and invite correspondence.

THE ST. LOUIS PURSE.

FIFTY DOLLARS PRO-RATA PREMIUM FOR ALL MAKERS OF BUTTER
SCORING 95 AND ABOVE—DONATED BY

HOFMANN BROS. PRODUCE CO., St. Louis, Mo.—\$10.00.

ST. LOUIS DAIRY CO., St. Louis Mo.—\$10.00.

HILMER, SCHEITLIN COMMISSION CO., St. Louis, Mo.—\$10.00.

H. McK. WILSON & CO., St. Louis, Mo., dealers in Dairy Apparatus
and Supplies—\$10.00.

TRAUERNICHT SHANKS COMMISSION CO., St. Louis, Mo.—\$5.00.

CORNET BROS., Wholesale and Retail Grocers, S. W. corner 13th
and O'Fallon Streets, St. Louis, Mo.—\$5.00.

The donors of this purse invite correspondence.

WINNERS OF ILLINOIS AND ST. LOUIS PURSE.

PRO-RATA.

J. P. Howell.....	Sharon.....	\$ 2 86
W. E. Walden.....	Stillman Valley.....	5 72
G. F. Burton.....	Mt. Carroll.....	5 72
Wm. Bote.....	Richmond.....	7 14
Geo. W. Hopperstead..	Eagle Lake.....	5 72
F. M. Murphy.....	Garden Plain.....	2 86
L. P. Harvey.....	Clare.....	4 29
Heber Harvey.....	Esmond.....	7 14
J. W. Segar.....	Pecatonica.....	2 86
W. W. Fleming.....	Alden.....	10 00
H. Eastman.....	Steward.....	2 86
A. Benson.....	Oregon.....	5 72
J. H. Werner.....	Naperville.....	4 29
C. E. Gemmil.....	Cutler Creamery, Cutler..	2 86
Herman Schlueter...	Germantown.	5 72
Grant Mallory.....	Freeport.....	8 57
Geo. Bloyer.....	Harper.....	7 14
J. H. Shurman.....	Bartelso.....	2 86
H. R. Duell.....	Franks.....	5 72
A. C. Winter.....	Waterman.....	5 72
Frank Clarke.....	Fair Haven.....	5 72
F. L. Metzger.....	Star Creamery Co., Millstad.	5 72
M. M. Lewis.....	Victor.....	2 86
Geo. E. Waterman ..	Garden Prairie.....	7 14
Geo. A. Cutler.....	Belvidere.....	2 86
Geo. Boesenberg.....	Lanark.....	4 29
W. Carbaugh.....	Nursery.....	2 86
Anton Buehler.....	Bemes, Will Co.....	7 14
K. B. Carpenter.....	Thomson.....	7 14
Herman Baetje.....	Smithon.....	3 58
O. Schultz.....	Waterloo.....	5 72
C. W. Wait.....	Union, McHenry Co.....	6 42
J. Munier.....	O'Fallon Creamery, O'Fallon.....	5 72
S. S. Merritt.....	Henry, Marshall Co.....	4 29
Geo. R. Wilson.....	Monmouth.....	2 86

\$180 09

SPECIAL PREMIUM LIST.

THE CITY OF RED BUD

Offers for the Highest Scoring Butter made in Illinois South of the Wabash Railroad, Hannibal, Springfield and Danville, RED BUD GOLD MEDAL, valued at \$25.00. There were four ties of 96, and lots were drawn by the editor of Chicago Produce for F. L. Metzger, Millstadt; O. Schultz, Waterloo; Herman Schlueter, Germantown, and J. Munier, of O'Fallon, the latter drawing the medal.

THE ELGIN BOARD OF TRADE

Offers a GOLD MEDAL to the buttermaker, working for a member of the Board, who scores the highest, valued at \$25.00. Won by W. W. Fleming, Alden, having first tied with Grant Mallory, but was raised on re-scoring.

F. W. BROCKMAN COMMISSION CO.—805 Third St., St. Louis, Mo.

Offer to the maker of the Highest Scoring Tub of Butter, weighing not less than 50 pounds, \$25.00 cash. Won by W. W. Fleming, Alden.

WELLS & RICHARDSON CO., Burlington, Vt.

Offer to the creamery buttermaker scoring highest with their Color, \$15.00 cash. Won by W. W. Fleming, Alden.

To the maker of the highest scoring Dairy Butter with their Color, \$5.00 cash. Won by S. S. Merritt, Henry, Marshall Co.

GENESEE SALT COMPANY—Mercantile Exchange, New York and Ogden Building, Chicago.

Offer to the maker of the Butter scoring highest of all, PROVIDED THE SAME IS MADE WITH GENESEE SALT, a Diamond Stud valued at \$35.00.

CHAMPION MILK COOLER CO., Cortland, N. Y.

Offer to the maker of the best Creamery Butter made from milk aerated at the farm with the Champion Milk Cooler and Aerator, \$15.00 cash. And if the same scores highest of all they offer additional \$15.00. No entries made for their premium.

CORNISH, CURTIS & GREENE MFG. CO., Ft. Atkinson, Wis.

Manufacturers of all kinds of Dairy Utensils, kindly lends one of their LEVER BUTTER WORKERS for the ocular demonstration in buttermaking, and then donates it to the maker of the highest scoring Dairy Butter. Valued at \$5.00. Won by S. S. Merritt, Henry.

WORCESTER SALT CO., New York.

Offer the maker of the highest scoring Creamery Butter salted with Worcester Salt, a Gold Watch valued at \$25.00. Won by W. W. Fleming, Alden. Second highest, a Gold Watch valued \$15.00. Won by Grant Mallory, Freeport.

THE FARM, FIELD AND FIRESIDE and THE DAIRY WORLD

Will be sent one year to each exhibitor whose butter scores 95 points or better.

THE ORANGE JUDD FARMER

Will be sent one year to the first six ladies who make entries for butter or cheese.

THE FARMERS' UNION

Will be sent one year to the four exhibitors of dairy butter who score next highest to 95.

THE FARMERS' REVIEW

Will be sent one year to the first ten who make entries for dairy butter.

THE ELGIN DAIRY REPORT

Will be sent one year to all makers of dairy butter scoring 95 and above.

THE NEW YORK PRODUCE REVIEW and AMERICAN CREAMERY

Will be sent for one year to the maker of the highest scoring creamery and dairy butter.

THE FARMERS' VOICE

One year to the first six unmarried ladies who enter butter for exhibition.

J. H. MONRAD

Winnetka, Ill., offers to each of the four creamery owners who first pay their own and their buttermaker's membership and enter butter, 200 copies "PATRONS' BULLETIN," a 24-page educational pamphlet for creamery patrons. Price is \$2.50 per 100 copies.

THE BUTTER EXHIBIT, DEMANDS OF ST. LOUIS MARKET.

BY F. W. BROCKMAN, ST. LOUIS, MO.

Mr. Monrad has asked that I should say something with reference to the butter exhibit. I want to say first that in the number of years that I have been in the butter business I have attended quite a number of gatherings where exhibits of butter were the order of the day, and I say it freely and without fear of contradiction that the exhibit which I had the pleasure of examining downstairs, has been so far as the general quality is concerned the best that I have ever run up against.

The score is ninety-five and a fraction on the average, which every one who knows anything about butter will admit is extraordinarily good. I do not pretend to be an expert, but for the last twenty-five years I have been in constant contact with butter and have fair knowledge, I believe, of what butter is.

So far as making butter is concerned there are a great many things entering into it which will have an influence on the quality, the conditions and surroundings and skill of the butter maker are not always the same. One day he has good butter, the next he has not; he cannot always tell what is the reason. Then the conditions surrounding the creamery and the climatic conditions have a good deal to do with it, and accidents are liable to happen to any one.

You have the question of flavor to deal with first; next the question of texture or grain, and then come the color and salt. and I consider is absolutely a matter of indifference as to the

scoring of the package. There are of course differences of opinion about all these matters, but I take it a man makes butter for the money there is in it, and the most money is made by the man who caters to the public taste and satisfies it. Butter, as we found it, is not what it is going to be in two weeks or two months, but I think that nine judges out of ten will score it according to what it is at the time of judging.

The question of grain is very easily settled.

The question of color I think ought not to cut any great figure in scoring butter, because the demand differs in different parts of the country. In St. Louis there are some few who demand high colored butter. We are gradually coming down in that regard to where the color is just about what it is for Chicago.

The demand in New Orleans is different again and so on through the country. The question arises what right has the judge to determine what is perfect color unless there is a specific understanding as to what point the butter is scored for. I believe that the judge should bear down hard only upon the points of flavor and texture, the others being almost entirely local questions of taste. In conclusion let me say that the awards made yesterday should satisfy any who have butter on exhibition.

When a man gets into the ninety's on his score, he has no great room for complaint, he comes very near making good butter. I believe a hundred points has been given, but in very few instances and that is right, the standard should be high.

I trust that the work which the judges have done will meet with your approval. It has been unbiased, we did not know one package from another. It has been simply a question of merit.

Our government has given \$100,000 to the sufferers in Klondike. I say we have a Klondike right here in our dairy interests, a Klondike that will probably put one hundred millions of gold in the treasury of the United States in the coming year, and so I feel that we have a right to push forward this interest and to ask that a proper appropriation should be made by the

state to protect this interest, and I believe it will be found that we can discount Klondike.

Mr. Monrad wishes that I should tell you something about the demands of the St. Louis market. I have been in the butter business there twenty-five years and I can sum up in two words what we want in St. Louis. "We want good butter."

As far as butter prices are concerned St. Louis market stands frequently at the head of any of the cities of this country. Of course, in order to command top prices several things must enter in. There must be absolute honesty on the part of the man who handles the butter, but not only that, he must be a butter man, and in touch with the creamery and dairy men.

The best results have so far been obtained by creameries who have made a practice to make and pack their butter as carefully as science and experience have demonstrated it should be done and they have thereby established a reputation. Such butter should always be branded and nothing but that which is perfect should enter the market either at St. Louis or anywhere else under that brand.

A great deal of the butter that comes to my house and other commissoin houses is never opened, we do not lift the lid off at all but we know the character of the butter and of the man who sends it; if it has such and such a brand upon it, we can rely upon it that it is good, it is perfect so far as any man can make it. If for any reason the butter is not up to grade, the brand should be left off and the commission man notified to do the best he can with it, and on no account to let it go out under that brand. These men must treat each other with confidence and absolute honesty.

Very little Elgin butter comes to the St. Louis market on commission. We buy it, either at the Elgin Board of Trade or in some other way. I would rather buy the butter nearer home if I could get it from our nearby creameries, and I am somewhat of an advocate of the protection idea and would

rather buy it right here than to go away from here as we are obliged to do now.

The term "near by creameries" has been associated in the minds of a great many St. Louis people with the idea that the butter is not as good as Elgin butter, and I guess there is some ground for that, but not to the extent that the average buyer takes for granted, his object being to buy the butter a little cheaper, but he will not often sell it for any less. It seems to me if the near by creameries can obtain the same price that the Elgin people get up in the north for their goods that they ought to be satisfied.

I have only one more thing to say. There seems to be an idea in this part of the country among some of the creamerymen that if they can get out their butter in small driblets to the groceryman, they will save money. I believe if they would look into this they would see that it cuts both ways. It pulls down the market. Some of the creamerymen are afraid to do business when a drummer comes to them. Let me suggest that you let the drummer put down in writing what he will agree to do, then ascertain if the house is responsible, and then ship the butter, and if he does not carry out his promises, hold the house responsible.

It is my earnest wish that the State Dairy Association may grow and flourish and that the next exhibit will be still better and larger and that they will keep on increasing as time goes on.

Mr. Tivy: Mr. Brockman has said that we want good butter in St. Louis. We want extra good butter.

I want to endorse every word that Mr. Brockman has said. The creameryman is hurting his own interests when he singles out grocers to sell his butter to, who come in competition with other grocers, they cut the price and the commission men are bound to meet it, so that if he sends some to the grocer and some to the commission man, he must not be surprised if the commission man doesn't do as well as he expected. They are

cutting their own throats in cutting up their shipments in that way.

Mr. Willson: I am glad to hear you take up the idea that scoring should be considered upon two points, flavor, and grain, as they are certainly the two points upon which depend practically the value of the butter, as a food product.

The object of scoring butter, as is generally understood, is to show to the various butter makers where they are deficient or proficient. As to color, the standard of color in New York is getting lighter and lighter every year and Chicago is following that line, as is St. Louis. Then there is a variety of tastes with reference to salt, but neither of these things affects the quality of the butter.

I want to criticise Mr. Brockman as to this extra high acid flavor that is demanded in butter. A high flavor that does not leave a fine clean taste in your mouth is not in my judgment perfect butter, and the commercial judgment for the last ten years has been growing in that direction. I say that high flavor has been developed by ripening to a point that when it goes beyond that, it begins to get worse. We want a flavor that will get better at ten days or two weeks, and I think that butter should be scored with that idea.

Mr. Spicer: Won't you tell us how you ascertain which way the tide is going, up or down?

Mr. Willson: Butter that is to be judged should be made at least a week before it is offered for judgment or ten days is better, and I would suggest that to the officers of this association. A man who buys five pounds of butter and puts it into a refrigerator wants to be able to eat it all up and have it all good. We don't want butter that draws up the muscles of the tongue, although the flavor may be high, but we want butter that is better at ten days than it is when it comes from the churn.

We want the quick, high flavor and the clean taste too, if you can get them both, but if you must sacrifice the clean flavor to that high, quick, noseey flavor, give us the clean, smooth flavor first.

Now, in order to make this kind of butter you have got to

have something to make it from, you can't make it from milk that has been badly handled, you can't cover up those bad flavors if you make that kind of butter, they will stay in your milk and in your butter, and I believe it would be better all around.

Mr. Tivy: There is some justice in the remarks of Mr. Willson, but I think they are calculated to lead some people astray. I will agree with him that the high flavor does cover up some defects, but that high, nose-y flavor that he speaks of you can get from the very best butter as well as from poor butter. If you take cream at the proper temperature and churn when it comes to the proper acidity for churning, it will have that flavor and it will continue for quite awhile. If you get a little under that, of course the flavor will mature in the butter and the butter will last longer, but the scoring has to be done at the time the butter is offered for judgment.

Mr. Brockman: Mr. Willson promised me he was going to ask me some questions, and I am glad he has started this thing, we have found out what his views on butter are. When I came into the butter business about twenty-five or six years ago, the choicest creamery butter was absolutely not in existence in this part of the country. We sometimes did receive from Wisconsin and the northern part of Illinois, dairy butter, which was considered the acme of perfection at that time. The usual custom of the grocymen then was not of going to the wholesale dealer or the commission man to get one or two tubs of butter, their first business was to bring down a washtub, or a half of a molasses barrel or something of that kind, and go down into the commission man's place and say, "You fill that for me, I want to take it home," and that butter which to-day would be scored at about fifteen out of a possible 100, at that time went to the table whether it was yellow, white, spotted or any other color. Now, some of the people have been educated to the idea that we are making better butter, I don't know whether all of them have yet arrived at that stage of perfection. One of the largest butter markets in this country has a grade called "extras," they have "firsts," "seconds," and then anything

that comes after that. Now what do the rules say shall constitute "extras?"

The first words upon which the inspector is bound to base his judgment in scoring this extra butter, say that "it shall be butter of high, quick flavor, perfect body, good salt, reasonable color and good package." Now, has a butter scorer the right to go beyond that, which is laid down by one of the best and largest commercial centers in the United States as constituting perfect butter? Not only this, but the creamery man has that classification in his mind in making the butter for scoring. I am afraid if Mr. Willson were in the commission business with the theory he has, he wouldn't sell all the butter he could get, because people demand high, quick flavored-butter, first and foremost, and will have nothing else. You try to sell a tub of butter that is ten days old, tell the customer that it is ten days old, and he will say, "Here is a tub that is fresh, give me some of that. We are in the business for profit to sell that which will bring the most money. We want that kind of goods from the creameries.

Mr. Willson: We have a feeling in Elgin that there are men who want to buy the kind of butter I speak of and they go into the market and they can't get it.

Mr. Newman: I think it is only fair to this audience here to explain that Mr. Willson is what we call riding a hobby just at present; that is, the pastuerization theory. I don't say there is anything wrong about it and we will all ride that hobby as soon as we find out that it is what the people want.

We make butter for the people, the citizens of the United States and other countries to buy, and we have educated them up through thirty years to this fine, high, quick-flavored butter and we believe they like it, at least they keep ordering it, and just as soon as Brother Willson has got his pastuerization along far enough so that they demand it that way, we will make it that way.

Mr. Boyd: I want to ask the gentleman if he means that when you have that high, quick, flavor, the bad taste always accompanies it.

Mr. Willson: Yes, it is what we call a winter taste.

Mr. Boyd: We are under the impression that we taste a great variety of things, but in reality there are only four things that you can taste, salt, sugar, acid and bitter.

This effect does not come from taste at all, it comes from flavor, if there is anything wrong about it. I can give you a dozen samples of butter, some of the very poorest kind, and some of the very finest, and if you hold your nose you can't distinguish one from the other; that is a well known fact. That is a physiological fact, not a theory at all.

Mr. Chubbock: I noticed the score card used here differs from the one used in our state, and I want to ask Mr. Brockman as to which he thinks is the better. Our scale gives flavor forty-five points, and grain, I think, thirty-five. This one gives fifty to flavor.

Mr. Brockman: I think that is a matter entirely of an arbitrary character. The Dairy Association of the state of Illinois simply chooses to call perfect flavor fifty. It is entirely a question of method.

Secretary Monrad: It has been our rule for a long time. My little experience in visiting dealers on South Water street has shown me that if the product is a little off on texture, it isn't nearly as important as the flavor, flavor is what they are after and will pay for.

I want to ask Mr. Brockman if it is not a fact that if you had two tubs of butter one with a high, clean flavor, and a little poorer body or texture, and the other one where these conditions were reversed, is it not true that you will every time pay a little more for the high flavored one?

Mr. Brockman: It will sell quicker.

Mr. Monrad: I want to say that while I am a firm believer in the introduction of pastuerization, where it is needed, still as long as we are judging, we want market judgment. If there had been butter offered here, marked "For Export," I should have asked the judges to judge that a little differently.

Mr. Tivy: The question of texture has been touched upon. Heretofore the proper texture has been considered that which

had been secured by one working, the butter becomes solid then and will stand up under circumstances under which butter that has been worked the second time will not. The question has been discussed considerably however of working butter the second time, in order that it may be more easily handled by the grocer, and there is something in that. I know that some grocers prefer it worked the second time, especially in cold weather, because it is easier to handle. Another thing, it is claimed that with the single working there is more water than in butter that is worked the second time. This is a question that should be decided on before judges go to work upon any lot of butter, they should know whether the texture should be considered and from which point of view. Another thing, I think it would be a good thing for this association and all others to try to arrive at a uniform standard of color, a color that is too high for the Chicago market might be perfection for some other market. We dealers met last spring and concluded that we would commence in the month of June, take that as a standard, and stick to the June color, and we have been able to carry that out pretty well, although there are some markets where they insist upon a high color. We all agree that May and June color is perfection. The Elgin Board exerts a great influence throughout this country.

Mr. Willson: Thank you, I am glad to hear that.

Mr. Tivy: I think they have a little too much sometimes. They have their wires all over the country. If they would send out a standard of color, it would undoubtedly do a good deal to establish the same color all over the country.

RESOLUTIONS ADOPTED AT THE ANNUAL MEETING
OF THE ILLINOIS STATE DAIRYMEN'S
ASSOCIATION

HELD AT RED BUD, ILL., JANUARY 11-13, 1898.

The committee on resolutions submitted a report; which after being discussed and amended, was adopted as follows:

Resolved that the following Petition be presented: To the Honorable Senate and House of Representatives of the United States in Congress assembled:

The Illinois State Dairymen's Association, respectfully represent that the present so-called free seed distribution costs over \$200,000 a year, including postage. We believe the people do not want the seed and regard this use of money an entire waste. We respectfully petition your honorable body to stop this waste.

Resolved: That the thanks of the Illinois Dairymen's Association are due and are hereby extended to the senators and representatives who stood so heroically by and worked for the passage of the Anti-Color Oleomargarine Law during the last regular session of the legislature.

Resolved: That the thanks of this organization be extended to his excellency, Gov. John R. Tanner, for his interest manifested for the dairymen and their work, in giving his official approval to the Anti-Color Oleomargarine Law.

Whereas: The experience of the last six months has taught us in a very practical manner that it is extremely difficult, if not impossible to strictly enforce, the wholesome legislation already obtained without an especial officer for that purpose; therefore be it

Resolved: That we recommend the law to be so amended as to provide for a State Dairy Commissioner who shall devote all his time to the enforcement of the dairy and other pure food laws of the state and that an appropriation be requested for the maintenance of the same.

Resolved: That we urge upon our several members of the State Senate and Representatives, that they earnestly labor to secure such legislation.

Resolved: That the members of this association here assembled do hereby pledge themselves to earnestly work for the accomplishment of this purpose; and that we will give our aid and support only to such men as will pledge themselves to this end; and that this shall be considered before party allegiance or other personal considerations.

The association hereby extends its thanks to the mayor and citizens of Red Bud for the hearty reception, genial hospitality, and pleasant accommodations furnished the association, and we trust that the pleasant relations formed during the meeting may continue and help to extend the influence and usefulness of the association.

We also extend our grateful thanks to all of those who have contributed papers or taken part in the programme and helped in the musical entertainment in any way to make the meeting a grand success.

Resolved: That the thanks and grateful appreciation of this association are hereby extended to the Hon. Secretary of Agriculture James Wilson, for sending Mr. R. A. Pearson to contribute such a valuable paper to the proceedings of the convention and for the interest otherwise shown by him in forwarding the dairy interests of the country.

On motion of Mr. Willson, the following resolution was unanimously adopted:

Resolved: That the thanks of the members of this association are due and are hereby tendered to Mr. J. H. Monrad, secretary of this association for the laborious and faithful work he has done in making this meeting a success.

On motion of Mr. Newman the following resolution was unanimously adopted:

Resolved: That the thanks of this association be extended to the National Dairy Union through Mr. Linn, and that we heartily approve of the work done by that Union during the past year, and hope for their success during the coming year.

On motion made by Mr. Stewart, and duly seconded the convention adjourned *sine die*.

SECRETARY'S FINANCIAL REPORT.

May 31st, 1897, to January 29th, 1898.

1897.

RECEIPTS.

August 16, Draft on Treasurer.....	\$15 00
September 7, Draft on Treasurer.....	45 00
September 16, Draft on Treasurer.....	522 07
September 17, Draft on Treasurer.....	150 00
November 4, Draft on Treasurer.....	70 47
November 4, Sold unclaimed tubs of butter from DeKalb....	9 18
November 4, Membership cards 118 and 119 for 1897.....	2 00
1898.	
January 3, Draft on Treasurer.....	127 00
January 8, Draft on Treasurer.....	50 00
January 14, St. Louis Purse.....	50 00
January 14, Illinois Purse.....	130 00
January 14, Red Bud Contribution.....	150 00
January 14, Advertising in Program.....	45 00
January 14, Sold butter donated by S. W. Peak.....	1 00
January 19, Membership cards (1 to 153, less three cancelled).	150 00
January 17, Thirty Drafts on Treasurer.....	161 50
January 19, One Draft on Treasurer.....	19 97
January 19, Draft on Treasurer.....	16 25
January 19, Draft on Treasurer....	7 00
Total.....	\$1,721 44

1897.

EXPENDITURES.

May 31, Balance due J. H. Monrad (see 1897 report).....	\$ 3 04
May 31, Engravings for 1897 Report.....	3 80
September 15, Printing 1897 report.....	515 60
September 16, Secretary's Balance of Salary.....	150 00
September 15th to January 19th, 1898, 620 10c stamps for 1897 Report.....	62 00
October 10, Secretary's expenses to St. Louis, Red Bud and Highland.....	24 85
November 6, Three thousand programs for Red Bud.....	65 75
November 6, Stamps for Red Bud.....	20 00
1898.	
January 10, Badges for Red Bud.....	14 45
January 19, Freight and Express, May 31 to Jan. 19, 1898.....	20 66
January 19, Stamps for Correspondence, May 31 to Jan. 19, 1898	22 05

January 19, Type Writing, May 31 to Jan. 19, 1898.....	9 35
January 19, Telegrams, May 31 to Jan. 19, 1898.....	3 11
January 19, Expenses Meeting President, May 31 to Jan. 19, '98	7 10
January 19, Stationery and Printed Matter, May 31 to Jan. 19, '98	33 07
January 19, Expenses Red Bud Meeting.....	415 27
January 19, Paid St. Louis and Illinois pro rata.....	180 09
January 19, Paid Cheese Premium.....	8 00
January 19, Red Bud Gold Medal.....	25 00
January 19, J. H. Monrad on account.....	50 00
January 29, Mrs. R. H. Kelly, stenographic report.....	88 25
Total.....	<u>\$1,721 44</u>

TREASURER'S REPORT.

January 11, 1898.

February 15, 1897, Balance on hand.....	\$ 441 02
August 28, By State Treasurer's Voucher.....	1,000 00
Total.....	<u>\$1,441 02</u>

DISBURSEMENTS.

March 13, 1897, to date, Paid Orders on the Treasurer, No. 326 to No. 333 inclusive; and No. 335-336-337.....	1,106 84
January 8, 1898, Balance on hand.....	\$ 334 18
As per bank book of the First National of Elgin.....	\$ 85 46
Statement of St. Charles Bank.....	248 72

Paid Vouchers—Bank book and Bank Statement herewith attached.
Respectfully submitted,

JOSEPH NEWMAN, *Treasurer.*

I. S. D. Assn.

NEXT MEETING.

The next meeting will be held January 10th, 11th and 12th, 1898. Cities desiring to secure it should correspond at once with the Secretary. These meetings have always been of great value, not only to the farmers, but also to the cities indirectly. It will be the silver anniversary of the association.

Elgin Board of Trade in 1897.

Below will be found a synopsis of the annual report of Mr. L. S. Taylor, Secretary of the Elgin Board of Trade, but the reader must remember that some of the factories included are located in Wisconsin. In all there was sold 44,224,020 pounds of butter valued at \$9,137,219.68, and 9,520,668 pounds of cheese valued at \$618,843.42.

Weekly Prices of Butter, Elgin Board of Trade.

—1897			
Jan. 4	19	19½	
" 11	19	19½	
" 18	19½	19½	
" 25	19½	20½	
Monthly average	19½c.		
Feb. 1	20½	20¾	
" 8	21		
" 15	20½	21	
" 22	18		
Monthly average	20 1-6c.		
Mar. 1	18		
" 8	18		
" 15	18		
" 22	18	18½	
" 29	22	22½	
Monthly average	19½c.		
Apr. 5	20		
" 12	16½	18	
" 19	16	16½	
" 26	16		
Monthly average	17 1-6c.		
May 3	14	15	
" 10	14½		
" 17	13½		
" 24	15		
" 31	14	15	
Monthly average	14 2-5c.		
June 7	14½	14½	
" 14	14		
" 21	14½		
" 28	14½		
Monthly average	14 2-5c.		

July 3	14½		
" 12	14½		
" 19	14½	14½	
" 26	14½		
Monthly average	14½c.		
Aug. 2	14½		
" 9	14½		
" 16	16¼		
" 23	18		
" 30	18		
Monthly average	16¼c.		
Sept. 6	17c.		
" 13	17½		
" 20	20		
" 27	22		
Monthly average	19½c.		
Oct. 4	22		
" 11	22		
" 18	22		
" 25	23		
Monthly average	22¼c.		
Nov. 1	23		
" 8	23		
" 15	22½		
" 22	22		
" 29	22		
Monthly average	22½c.		
Dec. 6	22½		
" 13	22		
" 20	21		
" 27	21		
Monthly average	21 3-5c.		

Monthly Averages for Twelve Years.

YEAR	Jan	Feb	Mar	Apr	May	Jun	Jly	Aug	Sep	Oct.	Nov	Dec	Yearly Average.
1897....	19½	20½	19½	17½	14½	14½	14½	16½	19½	22½	22½	21½	18½
1896....	21½	19½	21	15½	15½	14½	14½	15½	15½	19½	20½	21½	17½
1895....	23½	22½	18½	19½	17½	17½	17½	20½	25½	22	22½	24½	20½
1894....	24½	26½	21½	16½	16½	17	17½	23½	26½	24½	23½	21½	20½
1893....	31½	27½	27½	29½	23	19½	20	23½	21½	28½	26	27½	26
1892....	30	29½	28½	22½	19	18½	20½	23½	24	26½	30½	30	25½
1891....	26½	27½	31½	25½	22	17½	17½	21½	25	30½	28½	28½	25½
1890....	27½	27	24½	18½	16½	15	16½	21½	23	24½	27½	28½	23½
1889....	26½	29½	26½	24½	16½	16½	15½	18½	22½	23½	25½	27½	22½
1888....	32½	29	29½	25½	22½	19½	19½	23½	25½	32½	33½	33½	26½
1887....	31½	29½	31	24½	20½	18½	20½	26½	23½	24½	29½	32½	25½
1886....	32½	33	31½	28½	17	16	18½	21½	25½	27½	27½	30½	25½

ILLINOIS CREAMERIES BY COUNTIES.

Having sent out from three to four inquiring blanks to each county, attempting to confirm my list of creameries and secure other information, I have divided the State in three sections, the Southern, Central and the Northern, and though not at all accurate, it will give a fair idea of the condition for 1897. I appeal to all who read this and find anything to correct to write me at once.

THE SOUTHERN THIRTY-FOUR COUNTIES.

Of these fourteen are without any creameries and from five of these, ALEXANDER, HARDIN, WABASH, WAYNE and SALINE, no reports were received. Five report no silos and the corn stover mostly left in the fields to be eaten there. Of these WHITE, JASPER and PULASKI are reported as well adapted for dairying, while HAMILTON and UNION are only fairly so. In LAWRENCE, CRAWFORD and RICHLAND, though no silos are reported the corn stover is said to be taken good care of and hauled home to be fed. In MADISON is found two silos and milk is shipped to St. Louis. All but Richland report a smaller milk production for 1897, owing to drought.

Seven counties have only one creamery and of these four are closed, namely: at Golconda in POPE, Viena in JOHNSON, Benton in FRANKLIN and one in GALLATIN, whereas Carterville in WILLIAMSON, Waltonville in JEFFERSON and Bible Grove in CLAY are supposed to be running. Neither of these counties report any silos and the stover allowed to stand in the fields, and all but Franklin are said to be well adapted for dairying. Milk yield for 1897 less, owing to drought.

MONROE County has the Fountain Creamery Co. at Waterloo and the Hecker Creamery at Hecker. MASSAC has one at Unionville and one at Metropolis City. No report received from either. EFFINGHAM ships cream to St. Louis from Altamont and the one at Shumway is not running. This county reports no silos, but good care of the corn stover and an increased milk production for 1897.

In EDWARDS County there is a creamery at Bone Gab, West Salam and Albion, the latter being closed indefinitely. There are no silos, but the county is deemed especially adapted to dairying.

MARION has one at Alma, Patoka, Sandoval and Salem. Most milk and cream is shipped to St. Louis. No silos reported; corn stover fed in the fields and opinion divided as to its adaptability for dairying, one report claims an increase, another a decrease for 1897.

JACKSON has also four creameries, at Campbell Hill, Fountain

Bluff, Murhpyboro and Vergennes. There are three silos and stover is partly taken care of, partly fed in the fields; produced less milk on account of drought.

FAYETTE has a creamery at Brighton, Farina, Hagarstown and St. Paul, ships milk and cream to St. Louis; has no silo, but takes good care of the stover; is well adapted for dairying and an increase is reported for 1897.

PERRY County has six; at Conant, Cutler (2), Pinkneyville (2) and Swanwick; no report received.

BOND boasts seven, at Greenville, Mulberry Grove, Smith (2), Sorento, Stubblefield (2); Milk and cream goes to St. Louis; there is one silo; corn stover is cared for and the county well adapted for dairying, though the production was less in 1897, owing to drought and the neglect to provide soiling crops.

CLINTON has ten creameries, at Aviston, Batelso, Carlyle, Germantown, Breese, St. Rose, Trenton, Hoffman, New Memphis and Damiensville. No silos are reported and the stover mostly left in the fields. Good dairy county and milk yield about the same in 1897 as in 1896.

MADISON County has twelve creameries at Alhambra, Alton, Bethalto, Highland, New Douglas, North Alton, Upper Alton, Worden, Salem, Marine and St. Jacobs. There is a condensing factory at Highland doing a good business. There are two silos and good care is taken of the stover. Milk and cream goes to St. Louis, and the yield was less in 1897. It is a good dairy county.

WASHINGTON comes next with thirteen creameries at Addieville, Beaucop. Venedy, Three Mile Prairie (2), Hoyleton, Nashville, New Minden, Oakdale, Okawville (2), Stone Creek and Caspars. There are seven silos, stover is well cared for and some milk goes to St. Louis; the yield was less on account of draught, though it is a good dairy country.

ST. CLAIR has also thirteen creameries at Floraville, Freeburg, Lebanon, Lenzburg, Marissa, Mascoutah, New Athens, O'Fallon, Smithon, St. Libory, Belleville and Millstadt (2.) The corn fodder is mostly cut and hauled; there are six silos and milk yield was less. Milk and cream is shipped to St. Louis and that from Marissa Creamery is pasteurized. The county is well adapted for dairying.

RANDOLPH is the banner county in the Southern District and boasts eighteen creameries and one skim station, at Baldwin, Bremen, Coulterville (2), Chester, Ellis Grove, Houston, New Palestine, Ruma, Red Bud, Shiloh Hill, Sparta (2), Steeleville, Tilden, Prairie, Evansville, Welga and Ames (Skim station.) Nevertheless, there is only one silo; the stover is mostly left in the field, and it is reported less adapted for dairying (!) The milk yield is estimated 30 per cent. less for 1897.

This makes 106 creameries and two skim stations for Southern District, and it is evident that if the farmers had provided soiling crops there would not have been such a heavy shrinkage in the milk. This is so heavy that St. Louis milk dealers had to come pretty well up north to secure enough cream this winter.

THE CENTRAL DISTRICT.

Here we find eighteen counties, or more than half without any creameries running. Of these there are no reports at all from COLES, LOGAN, McDONOUGH, SCHUYLER and CALHOUN.

MORGAN reports four silos, CHAMPAIGN one (at the University,) SCOTT and DOUGLAS one each, only Scott reports most of the stover shredded and larger milk yield for 1897. The others feed most in the field and report less milk yield. Morgan and Douglas are reported as not especially adapted for dairying, the latter going in chiefly for cattle and hog feeding.

MASON, CUMBERLAND, CASS, DEWITT, MENARD and SHELBY have no silo; feed most of the stover in the field, and yet all but Mason, (which is too sandy) are reported as well adapted for dairying. All but Cass and DeWitt, (where the yield was about the same as in 1896) report less milk for 1897 on account of poor pastures (drought.)

HANCOCK is said to have creamery in Warsaw, LaHarpe and West Point but none running, the latter being changed to feed mill. MACON had one at Warrensburg but it not running. There are three silos; corn stover is mostly fed in the fields. A large milk yield is reported. MOULTRIE had a creamery at Sullivan; there are no silos and stover is eaten in the field. Both the latter counties are well adapted for dairying; there was no report from Hancock.

ADAMS is said to have a creamery at Quincy, CLARK one at York, (John Newman), SANGAMON one at Williamsville, (co-op.) and VERMILLION one at Danville, but from neither of these counties have reports been received.

BROWN County has two at Mt. Sterling (Mt. Sterling Creamery Co. and Brown County Creamery.) FULTON has one at Avon (N. C. Crissey) and a dead one at Astoria; no silos, stover fed in fields. JERSEY has one creamery at Fielden and a dead one at Grafton; no silos, but good care is taken of the corn stover and better milk yield is reported for 1897 owing to better pastures. PIKE has a creamery at Nebo and a dead one at Canton; no silo; stover fed in the fields. GREENE has one creamery running and one dead one at Greenfield; two silos, feeds most of the stover in the fields and reports a little less milk yield. CHRISTIAN has one creamery at Edinburgh, three silos, leaves most of the stover in the fields and reports a 25 per cent. shrinkage in milk for 1897. MONTGOMERY has a creamery at Donnelson used as skim station, has six or eight silos and though

part of stover is fed in the fields there is shipped a lot of milk and cream to St. Louis. These seven counties are all deemed well adapted for dairying.

EDGAR County has a creamery at Grover (Irene Creamery) and one at Paris, but sends no report.

MCLEAN has two at Chenoa (Chenoa Creamery and Jacob Bald-bach), one at Lexington and a dead one at Danvers. There are three silos, stover is partly fed in the fields and the milk yield was less.

TAZEWELL has two at Morton (V. Wick and D. Musselman) and one at Tremont, and no silo. Stover is fed partly in the fields, and the milk yield was less. Milk is sold to Peoria.

PIATT has one creamery running at Bement and dead ones at Atwood, Mansfield and Monticello. There are no silos, stover is left in the field and milk yield reported ten per cent. less.

MACOUPIN is said to have had creameries at Chesterfield, Gillespie, Mount Olive, Palmyra and Shipman, but they are reported as abandoned or run as skim stations. Milk and cream goes to St. Louis. There are only a few silos but the corn fodder is mostly cut. The yield for 1897 was less, partly on account of drought, partly because farmers thought prices too low. The last four counties are considered good for dairying.

This shows only twenty-six creameries running in these thirty-four counties.

THE NORTHERN THIRTY-FOUR COUNTIES.

This is the real Dairy District of Illinois and only four counties of the thirty-four are without any creamery. MARSHALL with one silo, stover eaten in the fields, no milk shipped and a yield much less than ninety-six. One dealer in Lacon bought two tons of creamery butter and yet there is made more dairy butter than consumed. Cream mostly raised in shallow pans. WOODFORD has no silos, stover left in the fields, raises calves and consumes all butter made. WARREN has sent no report and PUTNAM has two creameries one at Hennepin, but both are said to have failed.

STARK has one creamery at Wyoming, (Hammond & Galbraith) but sends no report. HENDERSON has one at Terre Haute but no silo; leaves the stover in the field and produced less milk in 1897. GRUNDY has a co-operative Creamery at Morris, (Grundy County Creamery Co.) with two skim stations. There is one silo and part of the stover is cut but the milk yield was less. There is some milk shipped to Chicago. KNOX has a creamery at Altona, (Caldwell & Anderson) one at Wataga (Sparta Creamery Co.) and a cheese factory at Ontario; sends no report.

PEORIA has a creamery at Princeville, Northampton, and a cheese factory at Alta, and there is said to be four more cheese fac-

tories. There are ten silos and fairly good care is taken of the corn-fodder. The yield was less.

FORD has creameries at Calvary (Pierce & Lowe), at Melvin (J. D. Thompson), and at Roberts (R. B. Chambers). There are no silos, stover is mostly left in the fields and the yield was less. Good corn county.

IROQUOIS has creameries at Buckley, Loda (Star Creamery Co.), Pitwood, Onargo and Watseka. The two last are gathered cream creameries. No silos, stover left in field and less milk on account of drought.

LIVINGSTON'S creameries are at Ancona, Cornell, Dwight, Fairbury and Odell. There are no silos and the stover is left in the field; the milk yield was about the same as in '96 and some is sold in Streator.

MERCER has six in all, two (P. Fitsemmler and J. G. Clark) at Creamery, one at Millersburg, New Boston, Viola and Swedona (J. G. Clark). No report.

KENDALL sends no report and has seven creameries at Little Rock (Hopkins & Feakins), at Lisbon (Convey & Co), at Millington (Palace Car Creamery Co.), at Oswego (Co-operative), at Plattesville John Conway & Co.), at Yorkville two, (Palace Car Creamery Co. and Fox River Creamery.)

ROCK ISLAND has eight creameries, two at Barstow, (Barstow Creamery Co. and Elgin Creamery Co., at Cordowa, at Hillsdale (J. H. Coxley), at Joslin, at Milan (G. H. Gurler), and two at Port Byron (S. Dailey), all in the northeastern part of the county. There are no silos, the stover is left in the field and the production was less on account of drought and increased calf raising.

HENRY has eight creameries at Annawan, Cambridge, Colona, Cleveland, Hooppole, Sharon, Geneseo two (Gilt Edge Creamery and Maple City Creamery Co.) No silo, stover left in field, milk yield less.

BUREAU has ten creameries at Ohio, Kasbeer, Lamoille, Walnut two (Walnut Creamery Co. and J. C. Weisenheimer), Van Orin (J. L. Healey), Sheffield (F. C. Boyden), Arlington (M. Lawrence), Buda Volapuk Creamery), Princeton (Wood & Walley.) There are two cheesefactories at Providence and at Tiskilwa (Willow Springs Factory.) No silos, half the stover left in fields and less milk. Steers and hogs rule the county to a great extent.

CARROLL has ten creameries of which John Newman Co. (P. O. Elgin), runs eight, two at Lanark (Lanark and Nursery), one at Argo, at Elkhorn Grove, at Fairhaven, at Milledgeville, at Mt. Carroll and at Thomson (York Creamery, E. Jobson one at Chadwick, Keltner Creamery at Keltner. Most of the stover is fed in the field. There is one silo. The yield was less on account of the dry fall.

LA SALLE has ten creameries, at Grand Ridge, Leland, Mendota, at Earlville (James McCreedy), at Norway (Palace Car Creamery), at Northville (Palace Car Creamery), at Serena (Cedar Springs Creamery), at Sheridan (Palace Car Creamery) at Triumph (Ernest Kuehl) and at Troy Grove (A. Nolting). There is not much dairying in southern part of the county. No silos. Stover is left in the fields and the yield was much less than in '96.

KANKAKEE sends no report but has eleven creameries. Three at Kankakee (Cruise Creamery, Park's Creamery and H. C. Anderson's Creamery), two at Reddick (Edwin Kriebel and M. T. Rielley & Co.), two at Solitt (Solitt Butter and Cheese Co. and Geo. W. Hoppenstead), one at Essex (C. E. Albert), one at Union Hill and at Momence.

BOONE has fourteen creameries of which Elgin Creamery Co. (P. O. Chicago), runs six (at Belvidere, Bonus, Capron, Garden Prairie, Hunter, and Popular Grove), Geo. Reed one at Herbert, County Line Creamery at Capron, B. Capron & Co. at Capron, Caledonia Creamery, Caledonia, Spring Factory at Herbert, Bloods Point Creamery and Irene Creamery at Irene and Popular Grove at Popular Grove. No report.

LEE does not send any report but has fifteen creameries. Two at Amboy (Amboy Co-operative Creamery and Maytown Creamery) two at Ashton (John Erhard and Ashton Creamery), one at Dixon (Duffey and Maloney), Eldena (Same), Franklin Grove (Clear Creek Creamery), Harmon, Paw Paw, Shaw, Steward (H. H. Hopkins), Walton (Rock River Creamery), West Brooklyn (Richmond & Townsend), Compton and Lee.

WILL has fourteen creameries, three at Crete (Acron Creamery, Inter-state creamery and Eagle Lake Creamery), two at East Wheatland (A. M. C. Todson and DuPage Valley Creamery), one at Endor, (Acron Creamery), Joliet (Jesse Baldwin), Plainfield (Godson & Co.), Tokio (DuPage Valley Creamery), Goodenow, Manhattan, Monee, Goodings Grove and Peotone. There are two silos in Crete township alone, the stover is partly left in the fields but the yield was larger in 1897. Milk and cream shipped to Chicago.

JOE DAVIES boasts seventeen creameries of which Elgin Creamery Co. runs four at Woodbine, Nora, Stockton and Apple River. Jas. Barnes two at Avery and Elizabeth. Pleasant Valley Creamery Co. two at Pleasant Valley and Stockton. John Newman one at Warren, J. P. Younger one at Avery, Geo. Schmidt at Elizabeth, John Moser at Galena, St. Louis Dairy Co. at Plum River, the Miners Creamery at Woodbine and one at Guilford, Devinda and Hanover. There are four silos but most stover is left out. The milk production is less owing to drought and increased Beef production.

WHITESIDE has sixteen creameries. A co-operative not running at Fulton and a skim station. John Newman Co. runs those at Union Grove, Round Grove and Morrison, E. H. Hewitt & Co. at Albany, John Gilbert at Sterling and Coleta, J. Wright at Fulton,

R. R. Murphy at Garden Plain, Bealer & Prestley at Fulton, Saml. Elgin at Sterling, Fee & Pratt at Tampico and one at Erie, Penrose, Prophetstown, (Skim Station at Lyndon), and Rock Falls. Four silos and good care of stover is reported, but the yield was less, as very few farmers provided soiling crops. None of the creameries are making cheese.

WINNEBAGO has seventeen creameries. Argyle, Cherry Valley, Elida, Harlem, Harrison, Seward and Shirland, three at Pecatonica (Elgin Butter Co., P. O. Elgin, Lysander Creamery Co. and Pecatonica Creamery Company), two at Durand (Laona Creamery and Elgin Creamery Co.), two at Rockford (Riverside Creamery Co. and Elgin Butter Co.), two at Winnebago (Winnebago Creamery and Edwardsville Creamery), Coon Creamery Co. at Rockton and Elgin Creamery Co. at Roscoe. Only about one tenth of the stover is saved and the shrinkage is reported as being 25 per cent. Milk and cream is shipped to Chicago.

COOK county. At Arlington Heights, J. L. Ehlers, J. B. Weidner, John Kehe and J. A. Sigwalt are reported as having creameries; at Palatine, F. E. Hawley & Co, C. Richmond, M. Richmond, Henry Rochelman and Sigwalt Bros.; at Barrington, August Boehmer, H. Boehmer, F. E. Hawley & Co and Union Creamery; at Bartlett Hickory Grove Creamery and Schultz & Son; at Desplaines J. W. Geils and a creamery at Proviso, Elk Grove and Wheeling, in all nineteen creameries mostly shipping cream and milk to Chicago.

LAKE County has twenty creameries. Aptakisic, (F. R. Tripp) Buffalo Grove, Diamond Lake, Deerfield, Gurney, Highland Park, (Sheahan Bros.) Ivanhoe, Libertyville, Lake Zurich, (F. E. Hawley & Co.) Long Grove, Millburn, Rondout, Russell, (Oak Grove Creamery) Volo, Gilmar, (F. E. Hawley & Co.) Fox Lake, Grays Lake, (Neville Bros.) Wauconda. (Wauconda Creamery and Lake Corners Creamery) Dighton, (Big Hollow Creamery.) Nine silos are reported and all stover is harvested, the yield was less owing to the dry fall.

OGLE has twenty-two creameries. Adeline (W. H. Jackson), Brookville (John Newman Co.), Byron (Lovejoy Johnson), Davis Junction two (MacDonough & Taylor and Taylor), Flagg, Forreston (John Newman Co.), Haldane (Haldane), Harper (Harper), Kings (H. H. Hopkins), Mt. Morris (R. C. McCredie), Oregon (H. H. Hopkins), Rochelle (Hopkins & Feakins), Stillman Valley two (Fielding Creamery and Ridge Farm Creamery), Taylor (Bert March), Creston (G. H. Gurler), Leaf River (Leaf River Creamery and Silver Creek Creamery), Myrtle, Polo, and Franklin Grove. Corn stover not cared for very much and the milk yield was less.

DU PAGE County has twenty-six creameries at Addison, Cloverdale, Naperville, Warrenville, Wayne, Wheaton, Lisle, Turner, Roselle two (Union Creamery Co. and L. Wilkening), Winfield two (Wilcox & Dooley and Winfield Co-operative Creamery), Roselle

(Wm. Kruse). Ontarioville two (Wm. Kruse and Ontarioville Creamery), Lombard two (York Center, B. & C. Co. and Lombard B. & C. Co.), Itasca two (F. Noble and Itasca Creamery), Elmhurst two (J. H. Baethke and F. Bushman), Bensenville three (August Asche, Fred Everding and H. Grobe), Lace (Corner Hill Creamery), Utopia (F. Bushman). The milk yield in this county was also less than 1896.

KANE has also twenty-six creameries. At Elgin nine are represented. Elgin Butter Co. (the oldest in the State), James A. Carlisle, Hawthorne Bros., James McCredie, John Newman Co., A. Nolting, W. W. Sherwin, A. M. C. Todson and D. E. Wood & Co., at Aurora three (Aurora Creamery Co., Fox River Butter Co., Palace Car Creamery Co.), Bald Mound (Co-operative Creamery), Batavia (Farmers' Creamery Association), Burlington (Elgin Butter Co.), Dundee (Oatman Bros.), East Burlington (A. Nolting), East Plato (F. A. Johnson), Hampshire (McCanna & Fraser Co.) Kaneville, (County Line Creamery), Maple Park (Oatman Bros.), St. Charles (W. W. Sherwin), Sugar Grove (S. G. Creamery Co.), Big Rock (B. R. Creamery Co.), Undina (John Newman Co.), Richardson (North Virgil Creamery). At Elgin the Illinois Creamery Co. manufactures Process Butter.

STEPHENSON has twenty-eight creameries of which John Newman Co. runs four at Buena Vista, Freeport, Ridott, Stevens; J. P. Younger (P. Freeport) runs five at Winslow, Florence Station, Orangeville, Balleyville and Afolkey; Elgin Creamery Co. three at Cockrell, Lena and Kent; Boemer Bros. two at Davis and Rock City; A creamery at Cedarville, Damascus, Dakota, Ellroi, German Valley, Legal, Loran (Dodge & Ballard), McConnell (Peter Danielson), Odgers (Pleasant View Creamery), Pearl City (Mitchell & Studebaker), Rock Grove (Wm. Mowery), Bolton (E. C. Dodge), Orangeville (Farmers' Mutual Benefit Association), Pearl City (Pleasant View Creamery). There are five silos, but stover is generally left in the field, the milk yield about same as 96.

DE KALB has thirty-four creameries and three skim stations. H. B. Gurler, of De Kalb, has one creamery and two skim stations, and one creamery at Five Corners; L. P. Harvey two (Clare and Esmond); Gurler & Hopkins (P. O. DeKalb) four (Hinckley, Lee, Shabona and Shabona Grove); Palace Car Creamery Co. two (Franks & Somonauk); George H. Gurler one creamery at Malta and a skim station at Miland. Further, there are creameries at Carlton (Richman & Stover), Colvin Park (Hutchinson & Hintze), Cortland (D. E. Wood), Elva Station (R. E. Wilcox), Genoa 3, (Ira J. Mix, South Riley Creamery and Cold River Creamery), Hinckley 2, (County Line Creamery and Cornell Bros.), Kingston (Base Line Creamery Co.), Kirkland (Elgin Butter Co.), New Lebanon (A. Nolting), Ney three, (South Riley Creamery, Ulmsted Creamery and Ney Creamery), Rollo, Sandwich, Wallace, Somonauk (Victor Creamery), Waterman (Richmond Bros.), Charter Grove (Best & McKellar), Sycamore three, (South Creamery, McDonald Bros. and Ohio Grove

Creamery.) There are twelve silos in the county and nearly all the corn fodder is harvested, the yield was considerable less owing to the dry fall, and a good deal of milk and cream is shipped to Chicago.

McHENRY, the Banner County boasts of fifty nine creameries and one skim station. F. W. Patrick of Marengo runs five creameries there, two at Woodstock, and one at Union. R. M. Patrick runs two at Marengo. W. A. Boies runs three at Marengo, one at Woodstock, at Harmony and at Union. Oatman Bros. (P. O. Dundee) runs one at Ringwood, two at Big Foot Prairie, one at Hebron, at McHenry and at Richmond. Elgin Butter Company one at Johnsburg. Cornell Bros. two at Huntley and one at Coral. Munger Dairy Company three at Harvard, one at Lawrence, one at Chemung and one at Hartland, two at Greenwood (Greenwood Creamery Co. and Douglas.) Creameries are also at the following places: Alden, Barreville, Nunda, Coral (Coral Creamery), Crystal Lake (Elkhorn Dairy Co.), Harmony (Cornell Bros.), Huntley (C. D. Chase), Marengo (James Hutchinson), Solon Mills (Farmers Co-operative Creamery, Woodstock (M. Miner, two), Cary Station (Henry Garben & Co.), Harvard, two, (J. E. Conklin) and Oak Grove Creamery Company. Hebron four (Hebron Creamery Co., Grove Creamery Co., Green Valley Creamery Co. and Spring Creek Creamery Co.); Richmond five (Hawthorne Bros., Stone Corners Creamery, J. Vosburg and Keystene Creamery); Ridgefield (Crystal Springs Creamery); Spring Grove (Farmer's Co-operative Creamery). There are about seventy-five silos and all corn fodder is taken good care of. The milk yield was rather less than in '96. Milk and cream is shipped to Chicago and some twenty creameries make cheese also.

SUPPLEMENT

CARE OF MILK ON THE FARM.

EXTRACTS FROM FARMERS BULLETIN 63 BY R. A. PEARSON, B. S.

Many dairy farmers are prosperous and have established the fact that the dairy industry can be made to yield good profits, while others, who seem to have the same opportunities for success, fail to find the profitable side.

On a large proportion of dairy farms many of the fundamental principles which should be observed in producing pure milk are almost entirely overlooked. This is usually due to lack of appreciation of their importance more than to intentional neglect. In most cases bad conditions are promptly improved when their dangers are known. Special knowledge is as necessary in conducting the dairy as in other occupations. When one understands something of the sciences affecting dairying, the changes in milk cease to be mysterious, unexplainable phenomena, and the work connected with the dairy, instead of being unprofitable, uncertain, and monotonous, as some consider it, may become profitable, interesting and instructive.

The value of milk when it is delivered to the factory depends largely on the care it has received previous to delivery, and its condition as well as its fat content should influence the price

paid for it. Every dairyman knows that the handling of milk the first few hours after it has come from the cow has a great influence on its quality and the quality of the products made from it. The care of milk seems a simple matter, but better methods in our dairies are of the greatest importance to the success and reputation of American dairying.

It is to the interest of every patron of a creamery or cheese factory that the milk used shall be the best and purest that can be produced. Anyone who increases his monthly check by adulterating his milk, accepts payment for what he did not deliver, and is stealing that amount from others to whom it belongs, but anyone who delivers badly contaminated milk to a creamery does even worse. His milk may spoil the entire production of the day, and thus largely decrease the returns to every patron. Butter and cheese makers should absolutely refuse to accept milk that is tainted or unfit for use; they must do this in justice to themselves and to patrons who deliver good milk.

The attempt has sometimes been made to estimate the losses caused by skimming and watering, and enormous amounts are named, but it is not believed that these nearly equal the losses caused by taints or changes in the milk due to neglect. In contracts and agreements the expression "pure milk" should not be taken to mean simply milk having a normal chemical composition, but freedom from all unnecessary contamination; the word PURE should be understood in its broadest sense.

BACTERIA.

When left to itself, under ordinary conditions, animal and vegetable matter sooner or later undergoes a change; these changes are familiar to everyone as decay, decomposition, putrefaction, or rot. The most common change of milk is known as SOURING; but there are many other fermentations, all of which were once supposed to be due to ill health of the cows, to foods eaten, to thunderstorms, etc. It is now known that changes of milk and other organic matter are caused by very small vegeta-

ble organisms called germs, micro-organisms, or bacteria. Different forms of these little creatures produce different effects. Some accomplish useful or harmless changes, while a few, known as pathogenic bacteria, produce disease in their host. If none of them were present no fermentative change would take place. But they are abundant in nature, and manage in some way to get into most organic substances.

Many persons think of the term bacteria as relating to a disease of some kind; they fail to appreciate that among these micro-organisms man has friends as well as enemies. They are great scavengers, and they have a most important connection with agricultural processes; in manufacturing certain products their action is depended upon almost entirely; they are absolutely necessary in the manufacture of fine butter and in giving variety to cheese.

DESCRIPTION OF BACTERIA.

Bacteria are so small that it is difficult to form a conception of their size; it would require many hundred of them in a continuous line to extend an inch. A thousand billion of them, if placed together, would weigh but a small part of an ounce. In a single drop of badly infected milk the bacteria may be counted by the million. It is evident that they cannot be seen with the naked eye, but require to be highly magnified in order to be identified. Bacteria are not all of the same size nor the same shape, nor do they all grow alike under the same conditions. Their differences in these respects aid in classifying them.

They are composed of a single cell, and the most common way by which they reproduce themselves is by the division of the "parent" cell into two smaller cells. This is accomplished by the bacterium gradually becoming more and more constricted about the middle until it separates into two parts; these increase in size, and the process is constantly repeated. Under favorable conditions multiplication takes place with great rapidity. A bacterium may develop and be ready to reproduce itself in a few minutes.

Another form of reproduction of bacteria is by spores. These correspond to seeds of plants, and are usually formed under circumstances not favorable to the continued development of the bacteria and their multiplication by division. Like the seeds of wheat, the spores can endure conditions which would be fatal to the growing form, and after surviving such conditions they quickly develop when more favorably situated. Some spores have been found to retain their powers of germination for more than ten years.

CONDITIONS AFFECTING BACTERIAL GROWTH.

Three things are essential for the growth and development of bacteria; they are food, warmth, and moisture, and when these are furnished, as they are to a greater or less extent in every dairy, the multiplication of bacteria takes place. Some species require other conditions besides those named; certain ones must have access to air, while others cannot thrive in the open air; some require to be in an acid medium, but to most species a medium having a neutral or alkaline reaction is necessary; darkness is requisite to some and preferred by most species; their growth is checked by bright light, and direct sunlight is fatal.

The food elements required by bacteria are present in the constituents of milk, and they are in a readily available state. Nitrogen, carbon, oxygen, and mineral matter are essential and are furnished by the casein, albumen, milk sugar, and mineral salts. The butter fat is of little importance as a food for germs.

Bacteria thrive within wide limits of temperature. The degree of heat has an important effect on their growth. Some species do best at a high temperature, near blood heat, while others prefer a lower temperature. Every person who has handled milk knows that if kept a long time in a moderately warm place it undergoes quite a different change from that which takes place at a high temperature. The reason for this is that different degrees of heat are favorable to different species of germs.

The species favored rapidly increases and covers up the work of others less favored, but which may continue to grow slowly. At about 90 degrees F. most forms grow with great rapidity, the rate of their multiplication decreasing with the decrease of temperature. Bacteriologists have shown that at 93 F. certain germs may increase in number in four hours more than two hundred fold, while at 55 degrees F. their increase is only about eight fold. An experiment is reported in which a difference of 18 degrees in the temperature of two samples of milk caused, in fifteen hours, a difference of almost 75,000,000 bacteria per cubic centimeter. This shows very plainly how much the rate of growth of bacteria depends upon temperature.

At 50 degrees F. bacteria are quite inactive, but at this and considerably lower degrees of heat they retain life, and some forms continue to multiply. Freezing does not kill them. Some species can withstand a temperature of many degrees below zero, and with the return of suitable conditions again commence to grow.

Up to a certain point the higher temperatures have the same effect as cold, i. e., make the germs inactive. But when the heat is raised to 125 degrees F. some are killed; others, not harmed by this temperature, are destroyed by greater heat. A sufficient temperature to kill almost all of the growing forms found in milk is 165 F. Spores require still more heat; some can withstand boiling temperature, 212 degrees F.

If milk is heated high enough to kill all the living forms of bacteria and then suddenly cooled to a low temperature, it will keep sweet a long time, because it is free from growing germs. It must be quickly cooled, however, or the spores will develop while the temperature is ranging from 110 down to about 60 degrees, and the bacteria thus formed may continue to increase slowly after the cooling is completed, at the low temperature at which the spores would not have germinated. When milk is heated for the purpose of killing bacteria (the process is called pasteurization or sterilization) it should be held at the highest temperature at least ten minutes, as some forms are not killed

by a short exposure to the same temperature which is fatal to them in a longer exposure. In dry air much higher degrees of heat than those named are necessary to kill bacteria. For this reason steam is generally used instead of dry heat for sterilizing utensils.

Bacteria also require moisture. It is well known that dead organic matter quickly disintegrates when it is in a moist condition and its changes are arrested when it is dried. Milk being a fluid, all the moisture that is necessary for micro-organisms is at hand. There is no danger of food being too dilute for bacteria; some forms do well even in distilled water. In milk, germs seem to find ideal conditions.

The chief agents that are antagonistic to bacterial increase are, together with light, the opposites to the first three favorable conditions mentioned above, viz., lack of food, extremes of temperature, and dryness. These are the dairyman's most important weapons, and when he has learned to use them properly he need have no fear of milk souring too soon or being otherwise affected by germs.

The operator of a creamery or factory is also sometimes able to take advantage of the fact that certain species of bacteria are antagonistic to each other and can not grow well together if they are in the milk at the same time. In such a case there is a battle for existence, the kind having the smaller number to start with, or being less favored than the other by temperature or other conditions, is usually overcome. Thus one can at times cut off the effects of undesirable bacteria by giving advantages to other desirable or harmless forms that are hostile to them. This is what takes place when the butter maker adds a "starter" to his cream and ripens it at a high temperature as rapidly as possible to prevent the increase of a taint which he may discover in the milk. A starter is a preparation or culture containing large numbers of the peculiar kind of bacteria that ripen cream; by its use proper forms of fermentation are started in milk or cream.

When micro-organisms are growing, new products are formed from the constituents of the medium by which they are sur-

rounded. For example, the lactic acid bacteria, which are the most numerous about a dairy, and which cause milk to sour, change the sugar of milk to lactic acid. After a certain amount of acid or other product of growth has been developed, some bacteria cannot longer thrive; the surroundings are so changed by their own operations that they cease to increase. This fact, however, is not of much practical value to the milk producer; the fermentation of his milk should never be allowed to proceed so far that it stops itself.

Bacteria cease to grow when in the presence of certain chemicals. When these are added to milk they are known as preservatives; when they are used for such purposes as killing the germs in or about a dairy they are known as disinfectants. Both of these will be referred to later.

DAIRY BACTERIA.

The greatest number of bacteria are to be found where their food is most abundant. Animals, feed, manure and milk are all hosts or breeding grounds for bacteria. For this reason the dairy is a place where myriads of germs of different kinds are to be found. They must be always kept in mind, studied, and persistently fought or controlled.

NUMBER OF BACTERIA IN MILK.

Milk ordinarily contains large numbers of bacteria. It is one of the few media that is well adapted to almost any species and quickly becomes inhabited with large numbers of those which obtain entrance to it. There may be from a few hundred to many million in a single drop, depending upon its exposure and the time and opportunity the germs have had for increasing. Dirt in milk is a sure sign of large numbers of bacteria. As the rate of increase is influenced by temperature, the number present at any time also depends much upon the previous temperature of the fluid. Russell has shown that the weather has a

marked influence on the bacterial content. He examined the milk of a patron on two successive days, the first being warm and the second cold and rainy; 1 cubic centimeter contained, respectively, 1,150,000 and 48,000 bacteria, or about one twenty-fifth as many on the cold, wet day as on the warm day. It is apparent that this difference was due chiefly to the purity of the atmosphere and a lower temperature.

Another investigator counted from 50,000 to 100,000 germs per cubic centimeter of the first milk drawn. In some cases the last milk is sterile, or germ free; in others it contains numerous germs. City milk usually contains from 10,000 to hundreds of thousands of bacteria in a single cubic centimeter.

The number of bacteria in a sample of milk is an indication of its purity, but not an absolute proof that it is or is not of good quality. Large numbers of harmless bacteria are sometimes found in good milk. It is the harmful ones and those that are liable to become harmful if present in too large numbers, that chiefly concern the dairyman. If they are kept out of the milk, or their growth is controlled, the number of harmless ones will also probably be reduced, for the measures that restrict one class have a like effect on the other. Whenever large numbers of harmless germs are found there is probability that dangerous forms are included.

KINDS OF DAIRY BACTERIA.

Over 200 different kinds of dairy bacteria are found in milk and its products, new and old. Many of these have not been completely described and will require much more study before their characteristics are fully understood. Different forms are found in different sections of the country. Different sources of contamination contribute different types of bacteria to the milk, and the large number of forms does not seem strange when their many sources are studied. One would expect to find a difference in kinds as well as in numbers of bacteria in milk of cows kept in pasture and milked in the open air, and in milk of cows continuously stabled. Such is the case. Especially is this true

in regard to the germs of manure, which are more abundant in the stable than out of doors. As a result of their struggle for existence, frequently a smaller number of species is in milk after it has stood than when perfectly fresh, although the number of individuals may have greatly increased.

For practical purposes, dairy bacteria may be separated into three classes, as follows: (1) Harmless bacteria; (2) useful bacteria; (3) harmful bacteria.

(1) Harmless bacteria.—These are the most numerous of the forms found in milk. They are of comparatively small direct importance to the milk producer, but they are not in milk when first secreted and, as suggested above, if they obtain entrance to it they are evidence that other germs also have had an opportunity to plant themselves.

(2) Useful bacteria.—Some forms of bacteria are essential to dairy operations. Cream is generally allowed to ripen or sour before it is churned—in other words, useful bacteria are given conditions favorable to their growth, and they cause acid to develop. Butter flavor depends upon several conditions, but one of the most important is the action of certain bacteria which, in the process of maturing or ripening, produce the desired aroma and flavor—cultures of bacteria for this purpose are now regularly sold on the market. The chief differences between varieties of cheese is caused by the kinds of bacteria that grow in them. Bacteria needed in some cases are not wanted in others, so the same species which are useful at one time may at another time be harmful.

(3) Harmful bacteria.—These form the most important class. They may be subdivided into two groups, viz., those having an injurious effect on the milk, and those not apparently affecting the milk but having an injurious effect on the health of the consumer. Many species fall in only one of these subdivisions; others belong to both.

Certain bacteria may be indirectly injurious by producing conditions favorable for other germs which are directly injurious, but not able to grow in milk until its nature has changed. For

example, a species which causes bitter milk does not thrive until the ordinary sour milk (lactic acid) germs have developed some acidity.

It is not necessary to go into details as to the many different changes produced directly and indirectly by numerous forms. Some are troublesome whenever they find their way into the milk; others become a nuisance only when they are present in very large numbers. Types that color the milk, form gas, or produce disagreeable flavors are always objectionable.

Farmers' Bulletin No. 29 treats more fully and technically of the bacterial changes of milk. The bad effects of those bacteria which produce a pronounced change in milk are usually confined to the milk itself. Its change is so marked that it is rarely used as food.

Some bacteria thrive in milk and do not have a marked effect on it but may cause disastrous results to the consumer. These are germs of disease and should be most carefully guarded against. Good proof exists of the transmission of several diseases by milk, and in a number of instances epidemics have been traced to an infected milk supply.

Another kind of bacterial action which may indirectly result in injury to health is referred to by Conn. He states that some of the common milk bacteria may be present in such great numbers as to produce poisonous toxins "which are directly injurious to the weak stomach of the infant or of the invalid." Many cases of cholera infantum and similar troubles are said to be due to these causes.

All forms of bacteria are objectionable in milk that is to be consumed as food in its natural state, and, indeed, most forms are undesirable in milk that is to be manufactured.

HOW TO KEEP MILK PURE.

Experiments have shown that the contamination of milk occurring under ordinary circumstances can be reduced over 95 per cent by taking care to avoid all possible sources of impurity and conditions favoring germ growth. The fact that bacteria

are usually attached to large bodies makes the work of preventing their entrance into milk comparatively easy. But with all the care that it is practical to observe, some bacteria will get into milk; therefore it must be cooled as soon as possible and held at a low temperature to prevent their multiplication. The different steps through which milk passes might be compared to the links of a chain—if one is weak the strength of the whole chain is impaired; so if the care of milk is neglected at any step the care taken at other times may be rendered useless.

Brief references will be made to each step in the production and care of milk, from the herd to the delivery of the milk to the creamery, cheese factory, or train.

THE HERD.

The first requisite for pure milk is healthy cows. Any animal suspected of being sick or out of condition should be immediately separated from the herd and not allowed to remain near the dairy. If the milk from such animals is used it must first be boiled. On every dairy farm there should be a proper place for keeping sick or suspected animals. It is absurd to claim that any large herd can be constantly maintained in perfect health, and when one finds a dairy farm with no provision for the care of sick animals, he has good cause to suspect that the milk from that place can not be implicitly relied upon for its purity.

When a herd is known to be sound, every precaution should be taken before adding new animals. In one case carelessness in this respect resulted in the loss of about 100 cows that had been in good health until a few fresh milkers, supposed to be also healthy, but later proved to be tuberculous, were introduced into the stable. The tuberculin test has proved to be a reliable means of ascertaining the presence of tuberculosis, and its use in any suspected herd is advised. It does not injure the animals and may be the means of detecting cases that could not otherwise be found, but yet be a source of infection to sound animals. It should be applied only by a competent veterinarian, and after a

herd has been tested no animals should be added to it unless known to be free from the disease.

There is little danger of a healthy cow giving abnormal milk if she is well cared for and not allowed to be excited, or unnecessarily disturbed. For this reason it is customary to have certain attendants always care for the same animals. But on some large dairy farms this practice is not followed, the claim being made that cows are satisfied with any attendant as soon as they become accustomed to frequent changes. No dog, unless it has been well trained, should be allowed in the pasture or barnyard, and the herd should never be driven rapidly to or from the pasture. If a cow is in the habit of hooking others she can usually be quieted by dehorning.

Bad effects of feeds may be avoided by changing them gradually and avoiding the use of those which give flavor to the milk—if the latter must be used, the best time is soon after milking. Cows may safely be allowed to graze in a pasture containing some garlic if they are stabled several hours before milking and given dry feed. Such articles as turnips, onions, sour ensilage, etc., should not be stored in the stable, as their odor is imparted to the milk through the air.

The proper time for commencing to use milk after calving is easily decided by its appearance and taste, and its behavior when boiled. Colostrum contains much more albumen than normal milk, and this coagulates into a solid mass when heated.

The cleaning of the cow is too often considered of small importance. Every milch cow should be carefully curried and brushed daily, and the udder and lower parts should always be brushed just before milking. Animals not accustomed to this care object to it at first, but with gentleness and patience on the part of the attendants they soon learn to expect it and to stand quietly during the operation, which contributes to their own comfort. It is not enough to clean only the lower parts, leaving the back and sides; the work should be thoroughly done. Some dairy-men groom their cows as carefully as horses are groomed in the

best stables, their coats are kept smooth and shining, and one need never fear soiling the hands by touching them.

A stiff, open brush does good work in removing dry matter, but soft and damp manure should be scraped from the hips and flanks, and when necessary this should be followed by a washing or repeated washings. It is generally recommended to carefully wipe the udder, teats, and surrounding parts with a damp cloth just previous to milking. This is for the purpose of moistening the dirt and bacteria, which if left dry are apt to be shaken off during the milking. Washing or wiping the udder or in any way agitating it before being ready to draw the milk is objected to by some milkers, who believe that this action makes the cow think she is to be immediately milked, and when the attendant returns half an hour later the usual amount or quality of milk is not obtained. Not a few practical dairymen make a regular practice of cleaning all the udders before milking is begun and notice no bad effect. It is probable that cows become accustomed to the cleaning and learn not to expect to be milked until the milker appears with the pail. Care should be taken not to make the parts too wet or the impure water will drip into the pail; they should be only slightly dampened. It is also necessary to use care lest the cow takes cold by being washed. The work of cleaning may be lightened by having the hair clipped about the udder and on the flanks, and by the use of clean bedding, not too fine.

The herd requires the most attention when continuously stabled. But it is almost as necessary to clean the animals when pastured as at other times, especially if they are permitted to wade in slimy pools. Wading in clean water is not objectionable, but cows should always be kept out of foul or sluggish water. The barnyard ought to be so well drained that stagnant pools of water are never seen there. If this is impossible, the pools should be fenced to keep the cattle out.

THE EMPLOYEES.

Contamination from attendants may be easily avoided. A dairyman should know the condition of health of every employe

connected with his dairy, and of all the members of their household. If at any time a contagious disease appears, the patient should be excluded from the dairy premises and all communication between the house and dairy should cease until the danger is past. The same care should be taken to keep any person who has been exposed to a contagious disease away from the milk. Those working in a dairy should not enter a house where there has been a contagious disease until it has been properly disinfected.

The personal cleanliness of the attendants is often neglected. They should be clean in appearance and habits. Clothes and hands require special attention. Outer garments, used for dairy work only, should be worn, and they should be cleaned often. If a separate suit is kept for milking and is hung in the stable and never aired, it looks and smells badly and is soon worse than the regular work clothes. White material that can be washed is the best for dairy suits. The objection made against white goods that they show dirt quickly is really in their favor. When a suit is soiled it should show it and be cleaned. On model dairy farms the suits are washed daily; this is not a difficult task, as they never become much soiled and they may be rough-dried. A hat or a cap should be used, to prevent hairs falling into the pail from the milker's head. If an entire special suit is not used when milking, one loose outer garment at least should be worn.

Just before milking the milker's hands ought to be washed. His finger nails should be cleaned, and they should be kept short and smooth at all times. An abundance of water and soap should be available and used. Some recommend washing the hands after each cow is milked; neglect of this has resulted in unconsciously carrying a disease, such as inflammation of the udder, to sound animals. Care must be taken not to let the hands touch the milk, as the skin always has more or less excretions on it, and these help to contaminate the milk. The hands should be kept dry, and if there are any sores they must be carefully covered before milking. Dirt and milk rubbed into

an abrasion on hands or teats cause ugly sores. Smoking or any use of tobacco while milking should never be tolerated, and clothing impregnated with the odor of tobacco should be discarded.

THE STABLE.

The place where the herd is kept and its care are second in importance only to the health of the animals. Infection from stable air can be largely avoided by using special care in feeding and cleaning. The air should not be full of dust at milking time. Some advocate the use of a special room for milking only. The effect of milking in pure air is shown by an experiment in which a cow was milked in an open field on a damp morning when the air was clear, and it was found that her milk contained only a few bacteria in the same volume which, under ordinary conditions in the stable, contained many hundred. No dusty food should be fed just previous to milking. If it is believed to be necessary for the cows to be eating at milking time, they may be given a moist feed then and the dry fodder used after milking. The animals and stables should be cleaned early and the stable well ventilated before milking is commenced. In a light, dry building, in hot weather, it is well to sprinkle the floor to settle the dust and lower the temperature.

Moldy hay or straw must not be used for bedding cows, as the special bacteria which they carry are liable to produce harmful changes in the milk. Clean straw or new shavings make the best bedding. In many places dry shavings from planing mills can be obtained at a trifling cost; in some cases they are in such demand for this purpose as to be bailed, shipped, and sold for four or five dollars a ton. Coarse stuffs for bedding are unsatisfactory, as they are usually poor absorbents and are uncomfortable for the animals and difficult to handle. No sensible dairyman will attempt to economize by using the refuse from the horse stalls for bedding cows. Clean sand is found to be a fairly good absorbent, but, like sawdust, it gets into the hair and makes extra work in cleaning.

Cow stables should be kept clean all the time; a little attention once or twice a day is not sufficient. If the cows are kept constantly in their places, an attendant should pass through the stables several times a day and remove all droppings. When the herd is large, a boy or man may well be continuously employed for this purpose. This is more necessary than formerly, on account of the high feeding usually practiced and the consequent soft manure of disagreeable odor. It is well to make free use of land plaster for the purpose of absorbing moisture and undesirable odors, as well as increasing the value of the manure.

At certain periods, depending upon the thoroughness of the daily work, the stables should be given extra careful and complete cleanings. The following directions may appear formidable, but they call for nothing more than is frequently done in many model dairies. No nook nor corner should be overlooked. All manure and fodder should be taken out, the six sides of every room swept, any rotten woodwork replaced, loose boards secured, dried accumulations about mangers, etc., removed, and the mangers scrubbed with hot water and soap, sal soda, or lye. If the floor is earth, it should be removed to a depth of a few inches and refilled with fresh material. After this work has been done, it is well to go over the walls, ceiling, floor, stables, etc., with hot steam direct from a boiler. Such careful cleaning should be followed by a coat of whitewash, which may be applied quickly and satisfactorily with a spray pump. It acts as a disinfectant and makes the building lighter. Care should be taken to have it penetrate all cracks and crevices. Whitewash may be easily made by mixing 60 pounds of water with 100 pounds of quicklime. To each quart of this mixture 5 quarts of water are added. Salt or glue are sometimes used to improve the quality. It should be applied at least twice a year. A receipt for whitewash, recommended by the Light-House Board of the United States Treasury Department, and in successful use for many years, is as follows:

Slake half a bushel of unslaked lime with boiling water, keeping it covered during the process. Strain it and add a peck

of salt, dissolved in warm water; 3 pounds of ground rice put in boiling water and boiled to a thin paste; half a pound of powdered spanish whiting and a pound of clear glue, dissolved in warm water; mix these well together, and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace, and when used put it on as hot as possible, with painters' or whitewash brushes.

DISINFECTION.

When milk has a strong taint at the time it is drawn, the trouble is usually not due to bacteria, and it can be improved by aeration. But when it is natural at first and gradually becomes more and more tainted the longer it is held, bacteria are probably to blame, and if the dairy is badly infected with them energetic measures are often required to get rid of them. If the affected milk is not harmful to health, but only objectionable on account of its smell or taste, its entire loss may be made unnecessary by pasteurizing or sterilizing it as soon as possible after it is drawn and before much of a change has been made, and then using it immediately or keeping where further infection can not take place. But this treatment does not affect the source of the trouble, and if that is not overcome by sterilizing all utensils and practicing scrupulous cleanliness everywhere, the disinfection of the stable or the killing of all the germs must be undertaken. Disinfection is also necessary if cattle have been affected with a contagious disease, and it should be done as soon as the last case is cured or removed and before other cattle are added to the herd. While the germs of some diseases are delicate and can live only a short time outside the body of their hosts, others are hardy and retain their vitality for months or years. Sunlight is a great purifier and should be admitted in abundance. The same may be said of fresh, pure air. Both of these aid in disinfection.

Whitewash partially serves the purpose of disinfection; it should soon follow other agents which are employed when more thorough work must be done. Before disinfection, the stable

should be carefully cleaned as above detailed, and any fodder which may have been stored where it was exposed should be destroyed.

Chemical disinfectants are efficient for thorough work. Most of these are poisonous and must be handled with great care. The cost is an important consideration in the selection of disinfectants for cheap buildings. The following are comparatively inexpensive: Bichloride of mercury or corrosive sublimate, in the proportion of 1 part to 1,000 of water, or 1 ounce to 8 gallons of water, is an effective agent. The poison should first be dissolved in a small amount of hot water and then diluted; it may be applied with a brush or as a spray. One pound of chloride of lime to 3 gallons of water is another effective disinfectant. Carbolic acid is well known; it should be used in the proportion of 1 part to 20 of water.

Sometimes it is best to use a gas as a germicide. In this case no animal nor person can remain in the inclosure being disinfected. It must be tightly closed so there will be no leaks through cracks or other openings. When sulphur is burned the building is soon filled with fumes. A considerable quantity should be supplied and fresh air excluded for twenty-four hours, to give full time for the gas to penetrate into every place where germs may be lodged. Chlorine gas is a more powerful disinfectant. It is generated by chloride of lime and muriatic acid. The fumes are very deadly, and great care must be taken not to inhale it. Formaldehyde is an efficient germicide which has recently come into use; it is a gas generated by special apparatus; it may also be applied in a solution.

One of the best and cheapest disinfectants for floors, gutters, waste pipes, etc., is sulphate of iron (copperas). For a floor, as much of this should be dissolved as water will hold; it is then applied with a sprinkler. Lumps of dry copperas are useful for purifying drains.

After a stable has been disinfected it should be allowed to remain empty several days for thorough airing.

CONSTRUCTION OF THE STABLE.

The construction of the stable has an important influence on the health of the cattle which it shelters, the way they are cared for, and the degree of cleanliness that exists. Unhandy, inconveniently arranged buildings are often the cause of much which should be done being left undone; especially is this true of the work of cleaning. The stable should be well located, and planned to facilitate the work of caring for the herd and to contribute to its comfort and well-being. Light and fresh air are essentials, and should be admitted in abundance.

A hard, smooth material, which does not absorb liquids and has no cracks, is the best for the stable floor. The stalls should be comfortable, not too long nor too short, and the gutters in the rear should be open, shallow, and with sufficient incline to carry off the liquid manure. High mangers are objectionable; some farmers feed on the floor to avoid mangers. Every stable should be as simply constructed as possible. (See Farmers' Bulletin No. 55 U. S. Department of Agriculture, The Dairy Herd; Its Formation and Management.)

THE DAIRY HOUSE.

The location of a dairy house, or room, must be carefully selected. On some farms it is found convenient and not objectionable to have it adjacent to or very close to the stable. It should be placed where it will not be reached by odors from the barnyard, and should be separated from the room in which the cattle are kept by two doors, or situated so it will be necessary to pass out of the stable before entering the dairy room. Special attention must be given to facilities for drainage. It is necessary to carry the waste a considerable distance from the building. An attempt should be made to keep the surroundings dry. The room should be thoroughly dried out, in all its parts, at least once a day. If shelves are of wood, they should be painted. The greatest care must be taken to keep all surroundings clean from fermenting or decaying milk, as well as other forms of dirt;

even sour milk ought not to be allowed to remain in the dairy room where there is other milk which should be kept sweet.

UTENSILS.

It is a mistake to purchase poor utensils or to keep them after they are badly worn. New cans and pails are frequently the cheapest means of improving the output of a dairy. In the selection of appliances, great care must be taken to get those which are simply constructed and can be easily cleaned. Pails, strainers, cans, and dippers—in fact, everything that comes in contact with the milk—should be well made, and there should be as few places for germs to attach themselves as possible. Vessels for holding milk should be made of a hard, smooth material. Wood is not adapted to this purpose. Many small utensils are now made of pressed tin and are free from seams.

The cleaning of every dairy utensil should be done promptly and thoroughly, first using cold or slightly warm water for rinsing, then hot water with a cleaning preparation, then clean hot water for rinsing, and finally boiling water or steam for sterilizing. Straining and wiping cloths also require careful attention. Of the special preparations for aiding in cleaning, sal soda or washing soda is one of the best. It would be a convenient arrangement for patrons of a creamery or factory to be supplied with this where their milk is delivered; they might also be furnished with brushes, strainers, pails, etc., at the same place, at cost price.

Boiling water is a satisfactory sterilizing agent, but heat must be almost continuously applied or the temperature will quickly fall to a point below which bacteria are not killed. Steam is a more effective sterilizing agent, and if there is much of this work to be done, a small steam generator will be found useful. If a feed cooker is located close to the dairy, its boiler may serve to supply all steam that is needed. It is an excellent practice to have cans cleaned and sterilized at the factory, where arrangements for such work can be made. After being cleaned, utensils must be kept in clean places and in pure air.

WATER.

A supply of good water is of the greatest value to a dairy. Spring or well water which comes from a considerable depth is the best, as it is the most free from micro-organism and is cold. Careful attention should be given to protect the water supply from the entrance of surface water, which is always rich in bacterial life, and is especially liable to get into the well or spring during the rainy season. It is also important to make sure that the supply is not contaminated by drainage from residences. The well should be located at a distance from any piles of filth or other contaminating influences; it is advisable to have the water examined occasionally by a bacteriologist. State and local boards of health make such examinations. A good way to help keep a well pure is to use from it freely; the water should never be allowed to become stale. Water is not purified by freezing, so if ice has been cut from a stagnant pond, or is formed from impure water, care must be taken to keep it from coming in contact with dairy products.

MILKING.

Milking is an operation which requires skill, as it has an important effect on the amount and quality of milk given. Dairy-men know that there are as great differences between milkers as between cows, and that cows will do much better with some milkers than with others. Indeed, good cows are often almost ruined by poor milkers.

The milker should avoid handling the cow more than is necessary, and he should make it a rule to do his work quickly and thoroughly. He should never go from a sick to a well cow without first cleansing his hands. The habit of wetting the hands with milk is filthy in the extreme and should never be practiced. Some people think it is necessary, but this is a mistake. The hands should be kept dry. If they are not, it is impossible to prevent drops of milk from constantly falling from them into the pail.

The pail should be held close to the udder, so as to expose the milk to the air as little as possible. The farther the streams fall, and the more they spray, the more dirt and bacteria they collect. Contamination from the foremilk may be avoided by discarding the first few streams drawn, or less than a gill in all. This entails little loss, as the first milk drawn is always poor in butter fat, and if it happens to be badly contaminated, as is frequently the case, much injury and trouble may be saved.

Milkers should be constantly on the lookout for unnatural milk, and when it is discovered, it should not be mixed with the rest, but boiled and fed to stock, or thrown away.

REMOVAL OF MILK FROM STABLE.

Milk must be removed from the stable as soon as possible after it is drawn to avoid germs and characteristic stable odors which it readily absorbs. It is not uncommon to see a large can placed in the passageway between the cows, where it is slowly filled and allowed to remain until the cows are turned out and the chores finished. It may be more than an hour from the time the first milk was drawn until it is cooled. Such delay must not be allowed if it is expected to keep the milk in good condition. Each pail, as soon as it is filled or when the milking of any cow is finished, should be carried to the dairy room. If a dairy house is located at a distance from the stable, the cans should be taken to it as soon as they are filled; and they should not be so large as to require a long time for filling. When there are many milkers and large cans are used, the cans may be carried to the dairy house by suspending them on a skeleton frame between two wheels, or they may be sent across on a cable stretched from the barn to the dairy house.

STRAINING.

If milk could be drawn in such a manner that no dust or dirt fell into it, straining would be needless. But this is impracticable, and it is necessary to remove foreign matter by some mechanical means. The sooner milk is strained the better. It

should pass through a metal strainer having a fine mesh and a flannel cloth or cheese cloth folded enough to prevent running through too fast. Both the cloth and metal strainer ought to be frequently rinsed during the milking to avoid gumming and to wash away fine particles of dirt removed from one pail which be later carried through, leaving the milk as badly infected as it would have been if not strained. The dirt should be removed from the milk so completely that when the milk is again strained at its destination there will be no cause for returning the cloth through which it passed to show to the dairyman the dirt collected.

The common strainer used over cans has flaring sides and a concave bottom, the wire gauze being in the center of the bottom. This only partially serves its purpose. It removes coarse materials, but holds them in the milk stream, and the soft impurities which are easily broken up by agitation and soaking, may be forced through the small openings by the constant current of milk.

Numerous improved forms of strainers are now made, and some of them are very simple, and effectively overcome the objection to the old style. In the pyramidal form the center of the metal gauze is raised and the straining surface is much increased; impurities striking against it work down until out of the current. Others are so arranged that the milk is rising when it passes through the gauze and dirt held back falls to the bottom of a settling chamber. A layer of cotton between two pieces of cheese cloth and pieces of wire netting to keep it in place, removes many fine particles which escape other materials. Cotton is cheap, and when much milk is handled one can easily afford to use it once and throw it away. Sand and gravel are used as strainers or filters, but special care must be taken to thoroughly clean and sterilize them. Filters are also used, the milk being forced through them by pressure.

When passing through the strainer large surfaces of the milk are exposed; hence it is important to do this work in a pure atmosphere.

AERATING THE MILK.

Aeration of milk is its exposure to the air for the purpose of removing "animal odor" or other taint. It is generally regarded by milk shippers and other handlers of milk as a useful operation. The benefit derived from aeration depends on how much the milk is tainted or "off." The product of a healthy cow, obtained with due regard to cleanliness and feeding, has little or none of the "cowy" odor. But it is different when the cow is slightly out of condition, is illy kept, or has been given some strongly smelling food previous to milking; then aeration has a beneficial effect, and although the taint is not entirely removed, it is reduced. It is of use chiefly in removing odors absorbed from the air or from food eaten by the cow; both these are the strongest when the milk is first drawn, while those caused by bacteria are least noticeable when the milk is fresh, and increase when it is held.

Milk is said to be "smothered" when it is tightly closed in a can immediately after milking, without cooling or the removal of gases which it contains. When thus treated it soon becomes unfit for use. Cans with holes in their lids are used to prevent this trouble, but ventilation is unnecessary if aeration is practiced. All taint should be out of the milk before the lid is put in place.

Aerating does not have a marked effect on the keeping quality of milk; its benefit is in removing undesirable odors. Some persons of sensitive taste can not drink unaerated milk, but relish it when aerated. The operation is done with varying success in several different ways. Usually the milk is cooled more or less at the same time it is being aerated, and it is due to this that its souring is retarded. Actively stirring or agitating milk serves to partially aerate it, and this should always be done if arrangements for more thorough work are not at hand. A better method is to dip from the can a few quarts and pour it back slowly from a height. This should be repeated many times, depending upon how much taint there is and the quantity of milk; or the milk may be poured from one vessel to another with the same effect. Still more thorough work is accomplished by al-

lowing it to fall through the air in fine streams or a spray. A milk pail with small punctures in the bottom and held a few feet above a larger receptacle answers for this purpose. Special apparatus is made to operate in the same way.

By other contrivances the air is carried to the bottom of the vessel, whence it rises through the milk in bubbles, bringing out with it the objectionable gases, until they are mostly removed. This requires from one to five minutes, and is done by a concave plunger or by a pipe and bellows. With the later arrangement air can be filtered through cotton to free it from impurities before it is introduced into the milk. Certain aerators are constructed so that the milk passes over them in a thin layer and is thus exposed to the air. These are referred to in connection with cooling.

Here again the necessity of fresh, pure air must be emphasized. It is better to omit aeration entirely than to attempt it in a stable or a close, foul place. As with other work in the dairy, promptness is necessary in aerating if best results are sought. The aerator should be large enough to care for the milk as fast as it is brought from the cows. *Even though it may be intended to use the morning's milk immediately, it should be aerated the same as night's milk.*

Experiments conducted by private enterprise seem to show that even the strong odor of garlic, which gives so much trouble and causes great losses in certain districts every spring and fall, can be entirely removed by heating milk and aerating it while hot. It is explained that the volatile oil, carrying the disagreeable odor, is liberated by heat and carried away by the fresh air. This process necessitates the pasteurization of the milk, which is far less objectionable than having a garlic flavor in the butter, and may even be beneficial to the product.

Much taint can be prevented by cleanliness. The so-called "animal" or "cowy" odor is generally to be attributed, not to natural milk, but to the exterior of the cow from which it is taken, or to the unclean person who does the milking, or to

filthy surroundings where the milking is done. Aeration is a means of only in part overcoming these neglects.

COOLING OF MILK.

When milk is for cheese or butter making and is to be soon used or promptly delivered at the factory, it may be cooled sufficiently by thorough aeration on the farm. But if it is not at once hauled away or is not to be immediately separated or set for cream, or must be carried a long distance, or is to be used in its natural form as food, fermentation must be checked by low temperature. Cooling is the only important operation in the dairy which should ever be modified, and then only under the conditions named. It is often stated that milk does not require so much care when it is to be used for butter or cheese making as when it is to be sold at retail. This is true in a way, only as far as the cooling is concerned, and it is very misleading. *First class butter or cheese can not be made from inferior milk*; for the factory, milk should be drawn and handled with all the precautions against contamination, the same as if it were to be sold at retail; but it need not be held at a temperature so low that the germs of lactic acid can not increase. A certain amount of acidity is necessary for cheese or butter making, and this may be allowed to partially develop in the milk before it leaves the farm without harm to the product. Some cheese makers prefer that the temperature never be allowed to go below 60 degrees F.

The lower the temperature to which milk is cooled and held, the longer it can be kept in good condition. It is the custom of some dairymen to serve their customers soon after milking and without first cooling the milk. In such cases it is impossible for it to long remain sweet, and within a few hours it undergoes more change than milk usually sold in cities; this is because the latter was promptly cooled and kept cold, although it may have been one or two days old when delivered.

It is hardly necessary to emphasize the importance of prompt and rapid cooling when the rate at which germs multiply in warm milk is understood. The milk from one cow should be cooled

while that from the next is being drawn. This is good for the milk, and it saves a tiresome delay of waiting for it to cool after all the milking is completed. It is not sufficient to set a can in a cold place and allow it to cool slowly; this requires several hours and gives time for the germination of spores and the development of bacteria. In order to get full advantage of low temperature the cooling must be completed at the earliest possible moment, and it should be carried down to about 40 degrees F. At temperatures above 40 degrees F. and below 60 degrees F. some species of bacteria thrive, though they do not cause as much trouble or loss as those which grow at still higher degrees. Milk from dairies where cooling is not practiced is frequently sour or tainted when it arrives at the factory; in such cases cooling is a preventative needed, and the labor necessary will be well repaid by the better product.

A common way of cooling is to place the can in a trough or vat of water and stir the milk; this is a tiresome operation, and the work is liable to be slighted; if the can is only half filled the temperature falls faster than when it is full. Putting ice into milk or cream must be done with caution; water is thus added, and there is danger besides of adding many impurities and germs which are not destroyed by freezing.

Cooling is so closely connected with aerating that the terms are often confused. Machines are constructed for the double purpose of performing both these operations at the same time. These are more efficient than setting in water and occasionally stirring by hand, and they are not very expensive. Milk may be cooled by such contrivances from 30 to 40 degrees in a few minutes. Coolers have a current of water running through them at the same time milk is running over the outside, cool the milk to within 3 or 4 degrees of the temperature of the water; such thorough work requires several times as much water as the bulk of milk. The best results are obtained when the cooling agent enters the cooler at the bottom and leaves at the top, so the milk is partly cooled before it receives the effect of the coldest water. Where running water is not available, a form of

cooler is used which holds a volume of water to which ice has been added. A cooler should be simply constructed, having all parts easily accessible for cleaning.

It is desirable for every dairy farm to have a never-failing cold spring, a good well, or a supply of ice, so that means for cooling milk will always be at hand. If ice is stored near the milk room and the business is large enough to justify the arrangement, a circulation of brine through pipes below the ice and through the milk cooler may be arranged, the cold brine being forced about the circuit by a pump. The drippings from the ice may also be used. The cooling of milk should receive the same attention in winter as in summer.

STORING OF MILK.

A large portion of the milk delivered to factories is first held on the farm from twelve to twenty-four hours and some times two or three days, and the conditions under which it is stored during this time have an important influence on its quality. Low temperature does not kill bacteria; it only renders them torpid and they regain their activity as soon as they are again surrounded by warmth; therefore it is as necessary to hold the milk at a low temperature as to cool it in the first place. As in cooling, for certain uses of the milk, very low temperatures are unnecessary, it should not be allowed to freeze.

The usual way of storing milk is to set the cans in tanks of cold water. Care must be taken to have at least three times as much water as milk and to have it higher on the outside of the cans than the milk is inside. If the milk is higher than the water a thin layer on top is not cooled so much as the rest, fermentation progresses there, and as soon as the can is moved this layer is disturbed and distributes a supply of bacteria through the remainder. The tank should be covered to confine the cold air, and when necessary, ice should be placed on the cans and in the water. If it is attempted to keep the cans cold by placing blocks of ice on them when grouped on the floor, a blanket

should be thrown over them. When delivery is not made for thirty-six hours, as on account of holding over Sunday, the milk should be held at a lower temperature than when delivered within twelve or fifteen hours.

In order to prevent the absorption of odors by milk, the place where it is kept must be free from any objectionable smell. Cold milk absorbs odors very rapidly. Water in the tanks must be kept sweet by frequent changes, and the shelves, walls, and floor must always be clean. Covers of the cans may be left on or off, but if there is any danger of contamination, the cans should be closed tightly after the milk gets cold.

Evening and morning milk should not be mixed, especially when the fresh milk has not been cooled. If this is done, the whole lot soon spoils. In order to insure the same quality of milk in each can, large tanks are frequently used for mixing all the milk of one milking. This is a matter of some importance when a sample from one can is used for determining the value of the lot, or when the milk is sold at retail.

The use of preservatives is mentioned at length in Farmers' Bulletin No. 42, U. S. Department of Agriculture, Facts About Milk. Some of them are dangerous to the health of the consumer, and any of them may be harmful if taken regularly in milk. They are prohibited by some state laws, are condemned by leading authorities, and should not be used.

HAULING TO THE FACTORY.

If milk is sold off the farm, the dairyman's care of it does not cease until he has delivered it to the factory or other destination, and then he has a right to insist that it be properly handled, if he is interested in the success of the concern which uses his product.

Milk should be hauled in spring wagons and the cans filled full to prevent churning while on the road. Much trouble is caused by allowing it to stand an indefinite period on a platform in the heat waiting for the collector; the storage tanks should be placed so it will not be necessary to remove the cans from the

water until the wagon is ready to start. A piece of canvas or a blanket thrown over the load protects the cans from dust and extremes of temperature. In hot weather it is an excellent plan to wet the cloth so that the air underneath will be cooled by evaporation. Padded jackets which slip over separate cans and protect the tops and sides are commonly used when cream is shipped in hot weather. Cheap burlap bags of the proper size, with holes cut for the handles of the cans, may be used to advantage to protect milk from heat during shipment; these covers should be thoroughly wet with cold water.

It is doubtful economy to hold milk in warm weather for every-other-day delivery; some factories require delivery twice a day in the hottest weather. In summer it is well to haul at night to avoid the hot sun. It is important to haul the milk in a clean wagon and to have nothing else in the load that could contaminate it.

Waste products should not be returned to the farm in the same cans used for delivering milk; other vessels should be provided for this purpose. If such hauling is unavoidable, consequent trouble can be reduced by having the skim milk or whey pasteurized or sterilized by boiling, and by keeping the tank clean. Patrons should insist that tanks for waste products (skim and butter-milk) be thoroughly cleaned daily.

FIFTY DAIRY RULES.

The following rules are based on the preceding text, and briefly summarize the subject discussed:

THE OWNER AND HIS HELPERS.

1. Read current dairy literature and keep posted on new ideas.
2. Observe and enforce the utmost cleanliness about the cattle, their attendants, the stable, the dairy, and all utensils.
3. A person suffering from any disease, or who has been exposed to a contagious disease, must remain away from the cows and the milk.

THE STABLE.

4. Keep dairy cattle in a room or building by themselves. It is preferable to have no cellar below and no storage loft above.
5. Stables should be well ventilated, lighted and drained; should have tight floors and walls and be plainly constructed.
6. Never use musty or dirty litter.
7. Allow no strong smelling material in the stable for any length of time. Store the manure under cover outside the cow stable and remove it to a distance as often as practicable.
8. Whitewash the stable once or twice a year; use land plaster in the manure gutters daily.
9. Use no dry, dusty feed just previous to milking; if fodder is dusty, sprinkle it before it is fed.
10. Clean and thoroughly air the stable before milking; in hot weather sprinkle the floor.
11. Keep the stable and dairy room in good condition, and then insist that the dairy, factory or place where the milk goes be kept equally well.

THE COWS.

12. Have the herd examined at least twice a year by a skilled veterinarian.
13. Promptly remove from the herd any animal suspected of being in bad health, and reject her milk. Never add an animal to the herd until certain it is free from disease, especially tuberculosis.
14. Do not move cows faster than a comfortable walk while on the way to place of milking or feeding.
15. Never allow the cows to be excited by hard driving, abuse, loud talking, or unnecessary disturbance; do not expose them to cold or storms.

16. Do not change the feed suddenly.
17. Feed liberally, and use only fresh, palatable feed stuffs; in no case should decomposed or moldy material be used.
18. Provide water in abundance, easy of access, and always pure; fresh, but not too cold.
19. Salt should always be accessible.
20. Do not allow any strong flavored food, like garlic, cabbage and turnips, to be eaten, except immediately after milking.
21. Clean the entire body of the cow daily. If hair in the region of the udder is not easily kept clean it should be clipped.
22. Do not use the milk within twenty days before calving, nor for three to five days afterwards.

MILKING.

23. The milker should be clean in all respects; he should not use tobacco: he should wash and dry his hands just before milking.
24. The milker should wear a clean outer garment, used only when milking, and kept in a clean place at other times.
25. Brush the udder and surrounding parts just before milking, and wipe them with a clean, damp cloth or sponge.
26. Milk quietly, quickly, cleanly and thoroughly. Cows do not like unnecessary noise or delay. Commence milking at exactly the same hour every morning and evening and milk the cows in the same order.
27. Throw away (but not on the floor, better in the gutter) the first few streams from each teat; this milk is very watery and of little value, but it may injure the rest.
28. If in any milking a part of the milk is bloody or stringy or unnatural in appearance the whole mess should be rejected.
29. Milk with dry hands; never allow the hands to come in contact with the milk.
30. Do not allow dogs, cats, or loafers to be around at milking time.
31. If any accident occurs by which a pail full or partly full of milk becomes dirty, do not try to remedy this by straining, but reject all this milk and rinse the pail.
32. Weigh and record the milk given by each cow, and take a sample morning and night, at least once a week, for testing by the fat test.

CARE OF MILK.

33. Remove the milk of every cow at once from the stable to a clean, dry room, where the air is pure and sweet. Do not allow cans to remain in stables while they are being filled.
34. Strain the milk through a metal gauze and a flannel cloth or layer of cotton as soon as it is drawn.
35. Aerate and cool the milk as soon as strained. If an apparatus for airing and cooling at the same time is not at hand, the milk should be aired first. This must be done in pure air, and it should then be cooled to 45 degrees

- if the milk is for shipment, or to 60 degrees if for home use or delivery to a factory.
36. Never close a can containing warm milk which has not been aerated.
 37. If cover is left off the can, a piece of cloth or mosquito netting should be used to keep out insects.
 38. If milk is stored, it should be held in tanks of fresh, cold water (renewed daily), in a clean, dry, cold room. Unless it is desired to remove cream, it should be stirred with a tin stirrer often enough to prevent forming a thick cream layer.
 39. Keep the night milk under shelter so rain can not get into the cans. In warm weather hold it in a tank of fresh cold water.
 40. Never mix fresh warm milk with that which has been cooled.
 41. Do not allow the milk to freeze.
 42. Under no circumstances should anything be added to milk to prevent its souring. Cleanliness and cold are the only preventives needed.
 43. All milk should be in good condition when delivered. This may make it necessary to deliver twice a day during the hottest weather.
 44. When cans are hauled far they should be full, and carried in a spring wagon.
 45. In hot weather cover the cans, when moved in a wagon, with a clean wet blanket or canvas.

THE UTENSILS.

46. Milk utensils for farm use should be made of metal and have all joints smoothly soldered. Never allow them to become rusty or rough inside.
47. Do not haul waste products back to farm in the same cans used for delivering milk. When this is unavoidable, insist that the skim milk or whey tank be kept clean.
48. Cans used for the return of skin milk or whey should be emptied and cleaned as soon as they arrive at the farm.
49. Clean all dairy utensils by first thoroughly rinsing them in warm water; then clean inside and out with a brush and hot water in which a cleaning material is dissolved; then rinse and lastly sterilize by boiling water or steam. Use pure water only.
50. After cleaning, keep utensils, inverted, in pure air, and sun if possible, until wanted for use.

PASTEURIZATION.

BY J. H. MONRAD, WINNETKA, ILL.

While it is to be hoped that farmers will carefully read the preceding article on care of milk, and follow the instructions given, it may be well to give a concise article on Pasteurization in its double effect as a means of preserving milk and of improving the butter from off-flavored milk.

PRESERVING MILK AND CREAM BY PASTEURIZATION.

The use of any and all chemical preservatives, even if not directly poisonous, should be condemned by all honest people, and there is no need of their use, as we have in heat and cold the means of preserving dairy products long enough for all practical purposes: Indeed, Mr. H. B. Gurler has shown us how cleanliness and cold alone is sufficient to keep milk sweet for several weeks, but as all farmers cannot be Gurlers, it may be advisable to use heat as well as cold.

It is an easy matter for anyone who has a thermometer to make an experiment in pasteurization on a small scale and convince himself of the effect. Unless more than 200 lbs. are to be pasteurized there is no need of buying any expensive apparatus. Get as many shot-gun cans (8 inches in diameter and 22 inches high, holding 40 lbs. each) as may be needed. Place them in an oblong boiler, made to order if necessary. Get a suitable tank for cooling, and a stirrer. That is all there is required.

I acknowledge, however, that if money and steam is at command, it is less work to use some special apparatus than to keep three or four cans stirred by hand, yet part of this gain is counterbalanced by the increased labor in keeping the apparatus

clean, and at present I know of nothing better for small quantities than common shot-gun cans.

Heat the water in the boiler to 170 or 180 degrees and stir the milk in the cans continuously until it is 155 degrees, then cover and leave for 20 minutes at that temperature. Remove the cans to a tank filled with water in which there is a lot of finely chopped ice. Stir all the time, the water as well as the milk, so as to cool it quickly. The stirring is essential to prevent cooked flavor.

The advantage of pasteurization to the consumer is in the increased safety against tuberculosis, and to the producer and seller the increased keeping quality. The disadvantage to the latter is the objection of some consumers to the lack of "life" in the flavor of the milk and still more the suspicion of it being of an inferior grade, as the cream does not rise as well in the bottles and the viscosity is reduced, making the cream appear thinner (poorer in fat) than it really is.

In some towns pasteurized milk and cream takes well, in others not, and milk dealers do well in going slow about it, and try on a small scale first.

The writer can see considerable advantage only in pasteurizing the supply for large cities, where the "surplus" milk is a serious problem.

PASTEURIZING IN CREAMERIES.

SKIM MILK.

Every farmer patronizing a creamery should insist on their skim milk (if not pasteurized) being heated to 180 or 190 degree Fah. This will keep the milk sweet long enough if the new milk is delivered in a good condition. There is no need of pasteurizing, the expensive part of which is the cooling. But the

temperature of 180 degrees should be reached or there is no assured safety, either as to the danger of tuberculosis or as to the milk souring.

Creamerymen who believe in the whole milk creamery system will do well in taking this precaution, which does away with or at least reduces the force of one of the most important arguments in favor of the use of the farm separator. It is in the interest of all parties to insist on the skim milk being thus heated and the farmers will take more interest in delivering the new milk sweet, so as to make it possible.

MILK AND CREAM FOR BUTTERMAKING.

The first question which naturally arises is: "Shall we heat the milk before skimming to the pasteurizing temperature and run it through the separator hot and cool the cream afterwards?" This plan was first tried in Sweden several years ago (1892?), but though it is used here and there, it seems that the majority prefers pasteurizing the cream.

Generally speaking the nearer we get to the cow the better effect pasteurization has and heating the milk before separating not only brings us a few minutes nearer the cow, but it enables hollow bowl separators to skim closer and for this reason we see the system praised to the skies by some and denounced by others. We lack careful experiments on a large scale to demonstrate this advantage, but pending the result of these, it is well to remember that milk often arrives at the creamery too sour for hot skimming, while it may yet be possible to pasteurize the cream, that sour milk may make fine butter, while tainted milk, even if sweet, does not. For this reason I am in favor of pasteurizing the cream instead of skimming hot, though the final results may be equally good. The fact that at Topeka one sample of hot skim pasteurized butter scored only 89 points and a pasteurized cream sample scored 96 points, does not prove anything.

When skimming hot the cream should be cooled to ripening

temperature and the skim milk should be heated to 180 degrees or more.

As to heaters for creameries (which should be continuous in action) we have in the market at present three. One made by the DeLaval Separator Co., New York and Chicago; one by A. H. Read, of Philadelphia, which is a copy of the modern Danish, where a rotating dasher elevates the milk or cream over the heated surface and forces it through a pipe some 7 or 8 feet (an advantage the other apparatus do not have); this is made specially for skimming hot and is of a very large capacity; one made by A. H. Barber & Co., of Chicago, where the milk or cream is passed over the surface of a rotating bowl, which is heated by the steam from the flyer which rotates it. Intending purchasers should investigate all; either of them do good work.

As to cooling these manufacturers and others make efficient coolers, but it is well to use only those that are easily cleaned and of a sufficient capacity. The first 50 to 70 degrees may be cooled with water of any temperature, even 78 or 80 degrees, as for instance, the water used for condensing purposes where there is a refrigerator machine. Hence it is better to have the cooler in two sections, the last one being cooled by circulating brine or iced water through it. In this manner the cost of cooling is reduced to a minimum.

RIPENING THE CREAM.

Having cooled the cream (from either system) to the desired ripening temperature (I prefer about 65 degrees), the most important work commences—the development of flavor. If the pasteurized cream be churned sweet it will give us a perfectly sweet, insipid butter, without even the faint aromatic flavor of raw, sweet cream butter, and just in proportion as the maker understands and carries out this ripening (which requires a good deal of attention to the little details) just so is his success. Starters must be used.

While just as good butter can be made from home made starters, the important advantage of greater uniformity can

hardly be obtained unless a reliable commercial one is secured. The first one in the market and one which has stood years' test is the Hansen's Lactic Ferment, of which the writer had the pleasure to try a sample in 1891—liquid—sent from Denmark packed in ice. This is now put up in powdered form and will keep good for several months. Of the two "Pure Cultures" prepared in America, the best results seem to be obtained from the Douglas culture when used in connection with an acid starter, but unless it is demonstrated that this gives better butter than the Lactic Ferment, it is certainly more trouble to prepare and keep up two starters than one. In using a commercial starter the reliability of the manufacturers is all important but in any and all cases common sense and perpetual watchfulness is necessary.

By using an acid test the butter maker can—if he is given the right right kind of creamery and outfit—guarantee a far more uniform quality of butter and he can also eliminate a great many taints and objectionable flavors, but it requires careful attention to every little detail and he must be on time and control temperature thoroughly.

SECURING GOOD TEXTURE.

The worst mistake (next to neglecting to develop flavor) made by beginners in pasteurization is that of not chilling the cream properly before churning. As soon as the cream is ripe, or nearly so it should be chilled down to 48 degrees and be kept there for at least two hours and then allowed to raise to the desired churning temperature. If this is done there is no need to fear a poor texture.

At the National Buttermakers' Convention in Topeka, this year, there was considerable complaint about the flavor and only 85 entries out of 478 or about 18 per cent. scored 95 and above which means grading real "extra," and 108 or about 22 per cent. scored below 90 points. As these entries, no doubt, may be said to represent the better part of the creameries and

some of them made with special care and selection of the milk, it cannot be denied that there is great room for improvement.

While I am not prepared to assert that pasteurization would more than cover its expenses in the case of those scoring between 90 and 95, I do not hesitate to claim that it would have paid well when the score falls below 90 if properly done.

As long as the butter scores extra it would be foolish to pasteurize if the creamery man looks at it from the immediate dollars and cents point of view, but if he looks ahead and works in the interest of his patrons he will adopt the system as in the long run it will help the patrons and eventually also him. To illustrate, when the separator first was introduced many creamery men hesitated to adopt it, they looked only to their own immediate profit and not on that of the patrons. Today many of these creamery men are out of business altogether.

Not that I advocate pasteurization in all our creameries at once—far from it—we are not prepared for it. We must have better built creameries and keep them cleaner, and we must have better makers and pay them better, but it is our duty to work in that direction and educate the makers to this higher plane. Then also can we talk to the patrons with a little more confidence about cleanliness when we set them a good example.

Some enthusiasts claim that pasteurization costs nothing. That is to say the least, rot! In every properly arranged creamery the exhaust steam should be utilized for heating wash water and the rooms, etc., and it thus has a certain value. The only case where cooling costs next to nothing, is where water of 48 can be secured without pumping and even then I should hate not to have ice.

It takes time to keep the creamery and all utensils as clean as pasteurization requires, not to speak about the extra apparatus, it takes time to prepare the starter and it requires a higher salary to secure the men that will tie to all these minute details.

I estimate the average cost of pasteurization in our western creameries at one-half cent per pound with one cent at maximum

but this does not include the tearing down and rebuilding of 80 per cent of the creameries which are totally unfit for pasteurization.

Nevertheless, I will guarantee that I can go into most creameries where butter scores below 90 and improve it by pasteurization several points, but I would not guarantee to continue to do so all the time unless the building was in a condition to be kept perfectly clean.

The way commission men return for "extra" which are not extra and pay a one-half cent "above" the market, does more to prevent improvement in the manufacture than all the indifference of the makers and economic ideas of the owners. If all butter marketed was paid on the strict scoring made at Topeka we should soon see creamery men turn to pasteurization for immediate relief and to better care of the milk for permanent improvement. The value of pasteurization is indicated by the significant fact that 90 per cent of the Danish co-operative creameries pasteurize, while but few of the large "estate" creameries (getting the milk from their own 200 or 400 cows) do so.



A Modern German Creamery from Martiny's Kirne und Girbe.

TEST ASSOCIATION.

BY J. H. MONRAD.

In the southern part of Jutland at "Veijen" was established the first Test or Control Association in 1895, and in 1896 I had the pleasure to translate a condensed report in "The Breeder's Gazette," of Chicago.

There is now, three years later, not less than forty such Associations in Denmark, twenty-five in Jutland. Only the invention of Babcock Test and its modification by Gerber, made it practical to do the work systematically. The Veijen Association combined for 5 years, as being the shortest period to get good results, and hired a young man to visit their farms (13) once a fortnight, test each cow and keep the accounts of the result, as well as an estimate of the feed consumed.

I reproduce only the detailed result on two of the farms A and B as they contain the full range of variations. The first column gives the number of the cow (generally burnt on the horns) the second her age, then the pounds of milk and the next the butter. The "*fodder unit*" column needs some explanation.

In Denmark they have adopted a simple unit which represents the equivalent values of different feed stuffs. It means that within reasonable limits they may be substituted for each other as follows: One pound of rye = 1 lb. barley = 1 lb. corn = 0.8 lb. oil meal = $2\frac{1}{2}$ lbs. hay = 4 lbs. straw (oat or barley = 4 lbs. potatoes = 6 lbs. skim-milk = 12 lbs. of whey = 10 lbs. of mangel wurzel = 12 lbs. of turnips.

This estimate is of course only approximately, but good enough for all practical purposes.

In these tables we have indeed a valuable lesson, a lesson which ought to make every man, who milks a cow, keep track of what she is doing.

Just think of it! cow No. 24 in table II made butter which cost her owner 78.5 cents! (in these tables the cost of feed only is figured, but it is quite general in Denmark to figure that the skim-milk pays for the care and the making of the butter.)

As the average price of butter for that year, 1895, was 23.22 cents, there was a net loss of 54.28 cents per pound, or \$32.56 for 1895 on that cow.

Twenty-six out of the forty-one cows on farm A (table I) produced butter at a higher price than the average price obtained and the six poorest produced it at double the price of the six best cows.

Is there needed any argument to prove that farmer A had

TABLE I.—FARM A.—FORTY ONE COWS.

No. of cow.	Age.	Pounds of milk.	Pounds of butter.	Fodder units.	Pounds milk to 1 lb. butter.	Fodder units to 1 lb. butter.	Cost of pro- duction 1 lb. butter.—Cts.
1	8	8385	313	3928	26.8	12.5	15.1
2	6	8819	280	4036	24.3	14.4	17.4
3	10	8541	266	4129	32.1	15.5	18.7
4	4	6773	255	3980	26.5	15.6	18.9
5	8	5256	238	3813	22.1	16.0	19.3
6	5	6586	248	3998	26.5	16.1	19.4
7	9	6211	237	3969	26.1	16.7	20.1
8	7	7615	259	4358	29.4	16.8	20.3
9	11	6870	250	4320	27.5	17.3	20.3
10	6	7741	242	4277	31.1	17.6	21.2
11	4	6760	236	4255	28.6	18.0	21.7
12	7	6147	237	4362	25.8	18.3	22.3
13	6	7274	240	4498	30.2	18.7	22.5
14	4	6021	220	4149	27.8	18.8	22.7
15	8	6051	213	4079	28.4	19.1	23.0
16	7	5265	213	4113	24.7	19.3	23.3
17	11	6510	228	4426	28.5	19.4	23.4
18	6	5543	199	3954	27.8	19.8	23.9
19	6	5480	219	4351	24.9	19.8	23.9
20	6	5233	202	4016	25.9	19.9	24.0
21	13	5333	186	3958	28.6	21.2	25.5
22	13	5566	193	4179	27.8	21.6	26.1
23	6	4790	177	3873	27.0	21.9	26.4
24	6	5689	187	4201	30.4	22.5	27.1
25	4	5248	181	4094	28.9	22.6	27.3
26	7	4015	147	3361	27.3	22.8	27.5
27	7	4643	182	4195	25.4	22.9	27.6
28	13	4685	160	3694	29.1	23.0	27.7
29	14	5041	166	3837	30.3	23.0	27.7
30	9	4768	166	3837	28.7	23.0	27.7
31	11	4537	167	3972	27.0	23.7	28.6
32	4	4026	162	3843	24.8	23.7	28.6
33	5	4666	163	3896	28.6	23.9	28.8
34	4	4166	162	3950	25.7	24.3	29.3
35	4	4250	159	3903	26.7	24.5	29.5
36	5	4239	152	3937	27.7	25.8	31.1
37	5	3254	132	3501	24.5	26.4	31.8
38	8	4547	145	3871	31.3	26.7	32.2
39	6	2488	115	3628	21.6	31.5	37.0
40	4	2841	111	3580	25.4	32.0	38.6
41	7	2636	112	3651	23.5	32.6	39.3
Average	7.17	5118	198.5	3999	27.3	20.15	24.28

TABLE II.—FARM B.—TWENTY-FOUR COWS.

No. of cow.	Age.	Pounds of milk.	Pounds of butter.	Fodder units.	Pounds milk to 1 lb. butter.	Fodder units to 1 lb. butter.	Cost of pro- duction for 1 lb. butter.
1	5	8297	334	4954	24.8	14.8	17.9
2	10	8305	308	4678	26.9	15.2	18.3
3	8	7250	320	4924	22.6	15.4	18.6
4	8	8140	308	4852	26.4	15.7	19.0
5	8	8607	300	4829	28.7	16.3	19.6
6	9	7422	296	5039	25.0	17.0	20.5
7	10	8407	295	5288	28.5	17.9	21.5
8	8	6162	251	4549	24.5	18.1	21.8
9	9	7987	264	4998	30.2	18.6	22.2
10	10	7697	249	4463	30.9	18.7	22.5
11	5	7255	250	4698	25.0	18.8	22.7
12	10	6904	250	4772	27.5	19.0	22.9
13	5	4731	220	4548	21.5	20.6	24.8
14	4	6211	216	4680	28.7	21.7	26.1
15	9	6646	224	4913	21.6	21.9	26.4
16	7	4960	195	4465	25.3	22.8	27.5
17	4	4686	179	4432	22.7	24.6	29.7
18	4	4432	173	4398	25.5	25.3	30.1
19	4	4281	165	4359	25.8	26.3	31.7
20	5	6214	171	4772	36.4	27.8	33.5
21	5	5074	183	5174	27.6	28.2	34.0
22	11	4366	157	4715	27.8	30.0	36.2
23	11	2815	110	4254	25.4	38.4	40.3
24	4	1663	60	3952	27.4	65.1	78.5
Average	7.2	6121	228	4703	26.76	20.56	24.90

been better off by far if the poorest half of his herd had been killed by lightning? Is there any better proof needed, that Mr. H. C. Adams, of Wisconsin, spoke the truth when he exclaimed: "*Gentlemen, it would be a blessing for our farmers if lightning would strike one-third of their cows!*"

I regret that the live weight of these cows is not given. I fear the strict rule about large and small cows might be exploded. There are several queer facts to be found by a careful study of these tables.

Thus cow No. 3 in table I, while she used 32.1 pounds of milk to 1 pound of butter, she used only 15.5 fodder units per pound of butter and is among the most economic producers. It is well to lay stress on this, as many progressive dairymen who have started using the Babcock Test have condemned cows giving milk below 3 or even 3.5 per cent fat without a fair year's trial, using the scale as well as the test. The above mentioned cow can hardly have given richer milk than 2.6 per cent, and yet she compares favorably with No. 13 in table II, who used

only 21.5 pounds of milk to 1 pound of butter, but consumed 20.6 fodder units to do it.

Is not the moral of all this: "*Use the scale and the test for a whole year on each cow, if you want to produce milk (butter fat) at a profit.*"

Farmer A produced butter at a loss of 1.06 cents per pound and no doubt had been convinced that "dairying don't pay." Perchance he thought the trouble lay in politics or in freight rates, but even if these evils were existent, how many cents per pound do you think it would influence the market?

But let us, on the other hand, imagine that lightning or the butcher had struck down twenty-one out of the forty-one cows on farm A, and see what the average cost of production would have been?

Just 18.4 cents per pound, giving a profit of 4.82 cents per pound, instead of a loss of 1.06 cents.

The fallacy of averages are pretty well shown up in Table III. The total average cost of production from the thirteen farms is slightly below the average sales price, and yet if we examine the averages for each individual farm, we find that on five farms it exceeds the selling price with from 0.71 to 1.77 cents per pound.

TABLE III.—AVERAGE PER COW.

Farm.	Number of cows.	Age.	Milk yield.	Butter yield.	Fodder units consumed.	Pounds milk to 1 lb. butter.	Fodder units to 1 lb. butter.	Cost of producing 1 lb. butter.
A	41	7.17	5418	198.5	3999	27.3	20.15	24.83
B	24	7.2	6121	228.0	4703	26.76	20.56	24.99
C	21	6.62	6784	244.6	4368	27.73	17.85	21.53
D	17	5.06	7116	263.8	4667	26.97	17.69	21.34
E	17	7.3	6134	211.7	4051	28.98	19.13	23.08
F	16	5.81	6223	239.5	4331	26.39	18.08	21.75
G	14	7.14	7567	284.5	4988	26.59	17.53	21.15
H	12	7.9	6615	237.5	4778	27.82	20.09	24.24
I	12	7.4	6710	233.5	4634	28.73	19.84	23.93
J	11	6.7	6437	232.8	4307	27.64	18.49	22.3
K	8	7.3	5478	206.9	4228	26.47	20.43	24.65
L	5	5.0	7053	243.2	4785	28.99	19.66	23.72
M	2	8.0	7021	251.0	4385	26.65	17.45	21.95
Total average	15.4	6338	231	4413	27.41	19.08	23.02

If our creameries could only induce their patrons to keep them posted as to the actual number of cows (and heifers) kept on the farm and the approximate amount of milk kept at home, they would get some startling average figures and soon induce the farmers to go into the testing of each cow.

Why should the creamerymen be interested? Because they would soon find that the patrons who kicked on the test and complain that dairying don't pay, do so because they milk the wrong cow.

I am not sure that the Danish associations is the best way for us. I am afraid the cost would be too high, but to start with, the creameries could encourage it by hiring a young competent man for testing the creamery milk and test for those farmers that desire it helping them with the keeping of the accounts so as to get uniform reports.

The State might encourage the formation of such an Association by a grant of say the young man's salary, letting the Experiment Station or the State Dairy Association appoint him and publish the reports. In Denmark the State gives a subsidy of about \$70 to each of the forty Associations. This would not be sufficient here but if we could get at least two Associations started by offering \$400 a year for five years to the two first Associations started, one in the northern and one in the southern part of the State, the effect would be worth twenty times the expense, and I appeal to the friends of the dairy interest for legislation in this direction, or assistance by private philanthropy. Millions of dollars are donated to help other industries, other professions to a better education, why not help the farmers in a practical manner worth twenty times the amount spent in theoretical education? Just think of the effect of these reports published (without names) in the local press, in the agricultural press, and discussed at Farmer's Institutes and school house meetings.

But granted even that no help is given, the cost need not be so very great after all. Young men just out from the agricultural college would be glad of such work at a nominal sal-

ary on account of the experience to be gained and might be secured for \$400 a year, each farmer boarding him and driving him to the next farm. In that case the actual cash expense for an association of twelve members with an average of ten cows would be a trifle over three dollars per cow, or \$15 for five years, that sounds a large amount, but think of the result. Nor is it likely to be more than half that amount as thirty out of the forty associations in Denmark comprise 500 cows.

I say the farmers who start the first association will not only help themselves, but do more than five conventions to promote good dairying.

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